

MDS-JE780

SERVICE MANUAL



Ver 1.0 2002.05

AEP Model
UK Model
E Model



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Model Name Using Similar Mechanism	MDS-JE480
MD Mechanism Type	MDM-7S1A
Optical Pick-up Type	KMS-260B/260E

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser ($\lambda = 780 \text{ nm}$) Emission duration: continuous MAX 44.6 μW^1)
Laser output	MAX 44.6 μW^1)
1) This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.	
Laser diode	Material: GaAlAs
Revolutions (CLV)	400 rpm to 900 rpm
Error correction	ACIRC (Advanced Cross Interleave Reed Solomon Code)
Sampling frequency	44.1 kHz
Coding	ATRAC (Adaptive Transform Acoustic Coding)/ATRAC 3
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz $\pm 0.3 \text{ dB}$
Signal-to-noise ratio	Over 98 dB during play
Wow and flutter	Below measurable limit

Inputs

ANALOG IN	Jack type: phono Impedance: 47 kilohms Rated input: 500 mVrms Minimum input: 125 mVrms
DIGITAL OPTICAL IN	Connector type: square optical Impedance: 660 nm (optical wave length)
DIGITAL COAXIAL IN (European model only)	Jack type: phono Impedance: 75 ohms Rated input: 0.5 Vp-p, $\pm 20\%$

Outputs

PHONES	Jack type: stereo phone Rated output: 28 mW Load impedance: 32 ohms
ANALOG OUT	Jack type: phono Rated output: 2 Vrms (at 50 kilohms) Load impedance: over 10 kilohms
DIGITAL OPTICAL OUT	Connector type: square optical Rated output: -18 dBm Load impedance: 660 nm (optical wave length)

General

Power requirements	
European model:	230 V AC, 50/60 Hz
Other model:	110 – 120/220 – 240 V AC, 50/60 Hz Adjustable with voltage selector
Power consumption	15 W (0.4 W in standby mode)
Dimensions (approx.)	430 x 95 x 285 mm (w/h/d) incl. projecting parts and controls
Mass (approx.)	3.1 kg

Supplied accessories

Audio connecting cords (2)
Optical cable (1)
OpenMG Jukebox CD-ROM (1)
Operating instructions for OpenMG Jukebox (1)
Remote commander (remote) (1)
R6 (size-AA) batteries (2)
USB cable (1)
Instruction manual

Design and specifications are subject to change without notice.

MINIDISC DECK

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Sony Corporation
Home Audio Company
Published by Sony Engineering Corporation

SONY®

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Ekspløsjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende type
anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens
instruksjoner.

WARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som
rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic break-down because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic break-down and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

Never look into the laser diode emission from right above when checking it for adjustment. It is feared that you will lose your sight.

Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED, AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION, UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT : UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT, NICHT DEM STRAHL AUSSETZEN.
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALT-TIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING : OSYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES, UNNGÅ EKSPONERING FOR STRÅLEN.
ADVERSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES, UNNGÅ EKSPONERING FOR STRÅLEN.
VIGYAZAT! : A BUKOLAT NYITÁSÁKOR LÁTHATATLAN LÉZERSUGÁRVESZÉLY! KERÜLJE A BESUGÁRZÁST!

This caution label is located inside the unit.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Flexible Circuit Board Repairing

- Keep the temperature of soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK $\triangle$ OR DOTTED LINE WITH MARK $\triangle$ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SELF-DIAGNOSIS FUNCTION

The self-diagnosis function consists of error codes for customers which are displayed automatically when errors occur, and error codes which show the error history in the test mode during servicing. For details on how to view error codes for the customer, refer to the following box in the instruction manual. For details on how to check error codes during servicing, refer to the following “Procedure for using the Self-Diagnosis Function (Error History Display Mode)”.

Self-diagnosis function

The deck's self-diagnosis function automatically checks the condition of the MD deck when an error occurs, then issues a three- or five-digit code and an error message on the display. If the code and message alternate, find them in the following table and perform the indicated countermeasure. Should the problem persist, consult your nearest Sony dealer.

Three- or five-digit code/ Message	Cause/Remedy
C11/Protected	The inserted MD is record-protected. ➔ Take out the MD and close the record-protect slot.
C12/Cannot Copy	You tried to record a CD with a format that the external device connected to the deck does not support, such as CD-ROM or video CD. ➔ Remove the disc and insert a music CD.
C13/REC Error	The recording was not made properly. ➔ Set the deck in a stable surface, and repeat the recording procedure.
	The inserted MD is dirty (with smudges, fingerprints, etc.), scratched, or substandard in quality. ➔ Replace the disc and repeat the recording procedure.
C13/Read Error	The deck could not read the TOC on the MD properly. ➔ Take out the MD and insert it again.

Three- or five-digit code/ Message	Cause/Remedy
C14/Toc Error	The deck could not read the TOC on the MD properly. ➔ Insert another disc. ➔ If possible, erase all the tracks on the MD.
C41/Cannot Copy	The sound source is a copy of commercially available music software, or you tried to record a CD-R (Recordable CD). ➔ The Serial Copy Management System prevents making a digital copy. You cannot record a CD-R.
C71/Din Unlock	The sporadic appearance of this message is caused by the digital signal being recorded. This will not affect the recording.
	While recording from a digital component, the digital connecting cable may have been incompletely connected and come loose or the digital component was turned off. ➔ Check the connection or turn the digital component back on.
E0001/ MEMORY NG	There is an error in the internal data that the deck needs in order to operate. ➔ Consult your nearest Sony dealer.
E0101/ LASER NG	There is a problem with the optical pickup. ➔ The optical pick-up may have failed. Consult your nearest Sony dealer.
E0201/ LOADING NG	There is a problem with the loading. ➔ The loading may have failed. Consult your nearest Sony dealer.

Procedure for using the Self-Diagnosis Function (Error History Display Mode).

Note: Perform the self-diagnosis function in the “error history display mode” in the test mode. The following describes the least required procedure. Be careful not to enter other modes by mistake. If you set other modes accidentally, press the **MENU/NO** button to exit the mode.

- While pressing the **◀◀AMS▶▶** knob and **■** button, connect the power plug to the outlet, and release the **◀◀AMS▶▶** knob and **■** button.
When the test mode is set, “[Check]” will be displayed.
- Rotate the **◀◀AMS▶▶** knob and when “[Service]” is displayed, press the **YES** button.
- Rotate the **◀◀AMS▶▶** knob and display “Err Display”.
- Pressing the **YES** button sets the error history mode and displays “op rec tm”.
- Select the contents to be displayed or executed using the **◀◀AMS▶▶** knob.
- Pressing the **◀◀AMS▶▶** knob will display or execute the contents selected.
- Pressing the **◀◀AMS▶▶** knob another time returns to step 4.
- Pressing the **MENU/NO** button displays “Err Display” and exits the error history mode.
- To exit the test mode, press the **REPEAT** button. The unit sets into the STANDBY state, the disc is ejected, and the test mode ends.

ITEMS OF ERROR HISTORY MODE ITEMS AND CONTENTS

Selecting the Test Mode

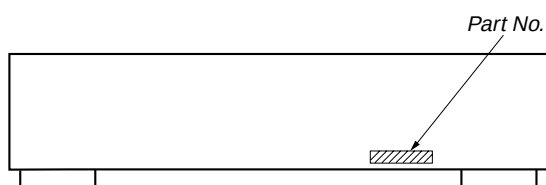
Display	History
op rec tm	Displays the total recording time. When the total recording time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min" The display time is the time the laser is set to high power, which is about 1/4 of the actual recording time.
op play tm	Displays the total playback time. When the total playback time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min"
spdl rp tm	Displays the total rotating time of the spindle motor. When the total rotating time is more than 1 minute, displays the hour and minute When less than 1 minute, displays "Under 1 min"
retry err	Displays the total number of retry errors during recording and playback Displays "r xx p yy". xx is the number of errors during recording. yy is the number of errors during playback. This is displayed in hexadecimal from 00 to FF.
total err	Displays the total number of errors Displays "total xx". This is displayed in hexadecimal from 00 to FF.
err history	Displays the past ten errors. Displays "0x ErrCd@@". X is the history number. The younger the number, the more recent is the history (00 is the latest). @@ is the error code. Select the error history number using the  knob.
retry adrs	Displays the past five retry addresses. Displays "xx ADRS yyyy", xx is the history number, yyyy is the cluster with the retry error. Select the error history number using the  knob.
er refresh	Mode for erasing the error and retry address histories Procedure 1. Press the  knob when displayed as "er refresh". 2. Press the YES button when the display changes to "er refresh?". When "complete!" is displayed, it means erasure has completed. Be sure to check the following after executing this mode. *Data has been erased. *Perform recording and playback, and check that the mechanism is normal.
tm change	Mode for erasing the total time of recording and playback Procedure 1. Press the  knob when displayed as "tm refresh". 2. Press the YES button when the display changes to "tm refresh?". When "complete!" is displayed, it means erasure has completed.
op change	Mode for erasing the total time of op rec tm, op play tm. These histories are based on the time of replacement of the optical pickup. If the optical pick-up has been replaced, perform this procedure and erase the history. Procedure 1. Press the  knob when displayed as "op change". 2. Press the YES button when the display changes to "op chang?". When "Complete!" is displayed, it means erasure has completed.
spdl change	Mode for erasing the total spdl rp tm time These histories are based on the time of replacement of the spindle motor. If the spindle motor has been replaced, perform this procedure and erase the history. Procedure 1. Press the  knob when displayed as "spdl change" 2. Press the YES button when the display changes to "spdl chang?" When "Complete!" is displayed, it means erasure has completed.

Table of Error Codes

Error Code	Description
10	Could not load
12	Loading switches combined incorrectly
20	Timed out without reading the top of PTOC
21	Could read top of PTOC, but detected error
22	Timed out without accessing UTOC
23	Timed out without reading UTOC
24	Error in UTOC
30	Could not start playback
31	Error in sector
40	Retry cause generated during normal recording
41	Retried in DRAM overflow
42	Retry occurred during TOC writing
43	Retry aborted during S.F editing
50	Other than access processing, and could not read address.
51	Focus NG occurred and overran.

MODEL IDENTIFICATION

— BACK PANEL —



MODEL	PARTS No.
AEP models	4-238-939-1□
UK model	4-238-939-2□
SP model	4-238-939-5□

- Abbreviation
SP : Singapore model

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SECTION 1 SERVICING NOTES

JIG FOR CHECKING BD BOARD WAVEFORM

The special jig (J-2501-196-A) is useful for checking the waveform of the BD board. The names of terminals and the checking items to be performed are shown as follows.

GND : Ground

I+3V : For measuring Iop (Check the deterioration of the optical pick-up laser)

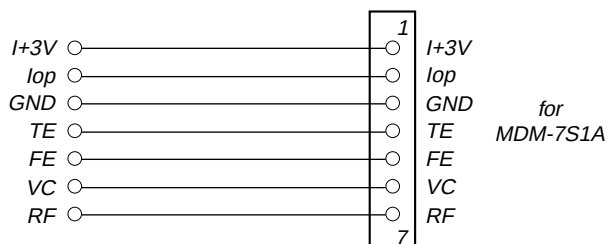
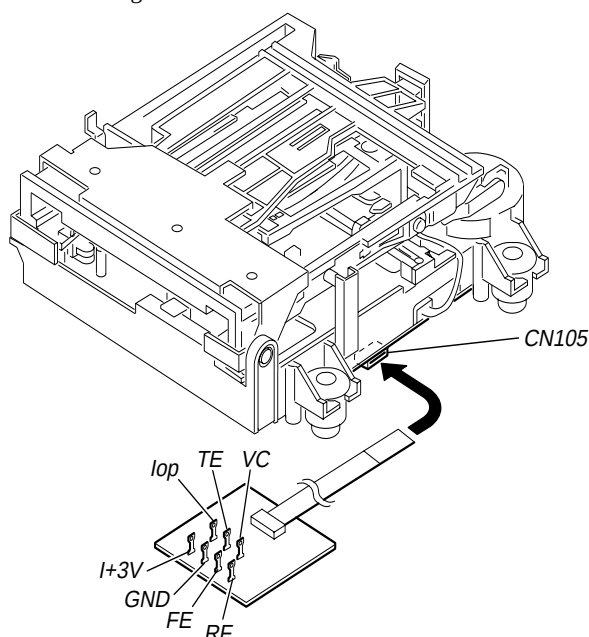
Iop : For measuring Iop (Check the deterioration of the optical pick-up laser)

TE : TRK error signal (Traverse adjustment)

VC : Reference level for checking the signal

RF : RF signal (Check jitter)

FE : Focus error signal



Iop DATA RECORDING AND DISPLAY WHEN OPTICAL PICK-UP IS REPLACED

The Iop value labeled on the optical pick-up can be recorded in the non-volatile memory. By recording the value, it will eliminate the need to look at the value on the label of the optical pick-up. When replacing the optical pick-up, record the Iop value on the optical pick-up according to the following procedure.

Record Procedure:

1. While pressing the **[◀◀ AMS ▶▶]** knob and **[■]** button, connect the power plug to the outlet, and release the **[◀◀ AMS ▶▶]** knob and **[■]** button.
2. Rotate the **[◀◀ AMS ▶▶]** knob to display “[Service]”, and press the **[YES]** button.
3. Rotate the **[◀◀ AMS ▶▶]** knob to display “Top Write” (C05), and press the **[YES]** button.
4. The display becomes “Ref=@@.@” (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the Iop value written on the optical pick-up.
To select the number : Rotate the **[◀◀ AMS ▶▶]** knob.
To select the digit : Press the **[◀◀ AMS ▶▶]** knob.
6. When the **[YES]** button is pressed, the display becomes “Measu=@@@.@” (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the **[YES]** button.
8. “Complete!” will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become “Top Write”.
9. Press the **[REPEAT]** button to complete.

Display Procedure:

1. While pressing the **[◀◀ AMS ▶▶]** knob and **[■]** button, connect the power plug to the outlet, and release the **[◀◀ AMS ▶▶]** knob and **[■]** button.
2. Rotate the **[◀◀ AMS ▶▶]** knob to display “[Service]”, and press the **[YES]** button.
3. Rotate the **[◀◀ AMS ▶▶]** knob to display “Top Read” (C26).
4. “@@.@/##.#” is displayed and the recorded contents are displayed.
@@.@ : indicates the Iop value labeled on the optical pick-up.
##.# : indicates the Iop value after adjustment
5. To end, press the **[◀◀ AMS ▶▶]** button or **[MENU/NO]** button to display “Top Read”. Then press the **[REPEAT]** button.

OPTICAL PICK-UP BLOCK TYPE DISCRIMINATION

There are two types of the optical pick-up block in this model.
These are compatible except for the laser power.
Check the type of the optical pick-up block before replacement.
Adjust following items after replacing the optical pick-up block.

- 5-6-2. Laser Power Check (See page 26)
- 5-10. LASER POWER ADJUSTMENT (See page 29)

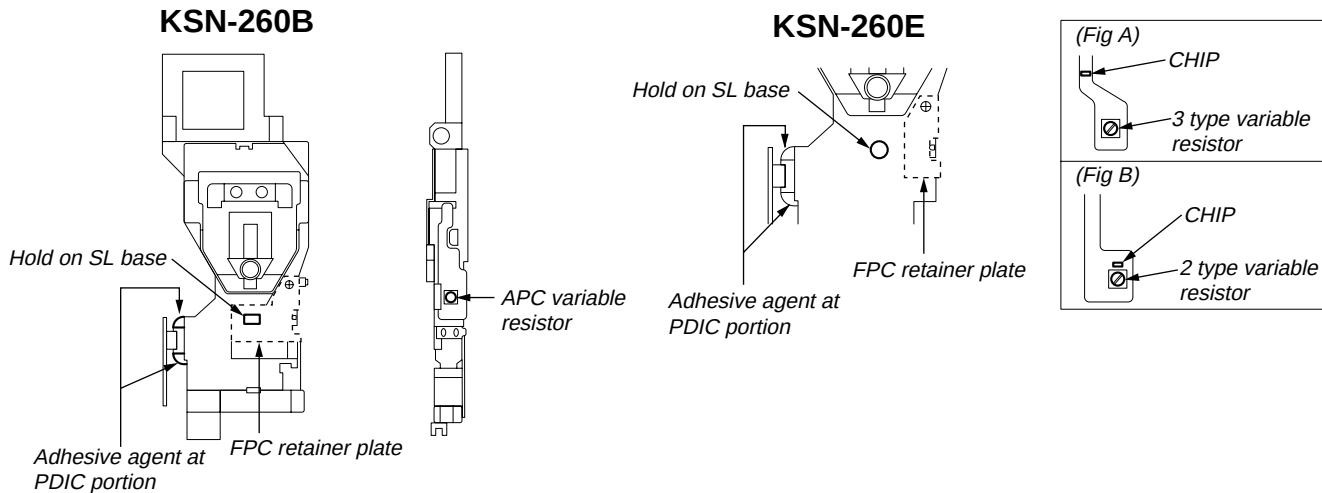
Differences

	KMS-260B	KMS-260E
Color of the adhesive agent at PDIC portion	Pink	White
Form of FPC retainer plate	Close the hole on SL base	Not close the hole on SL base
APC variable resistor	Small volume (2 type)	Big variable resistor (3 type) and chip resistor (Fig. A)
		Small variable resistor (2 type) and chip resistor (Fig. B)

Fig. B type is for repair.

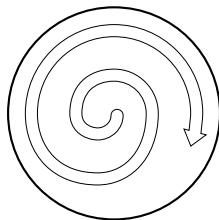
- Abbreviation

260B: KMS-260B model
260E: KMS-260E model



• CLEANING THE OPTICAL PICK-UP

- Note 1:** In cleaning the lens, do not apply an excessive force
As the optical pick-up is vulnerable, application of excessive force could damage the lens holder.
- Note 2:** In cleaning, do not use a cleaner other than exclusive cleaning liquid. (KK-91 or isopropyl alcohol)
- Note 3:** Wipe the objective lens spirally from center toward outside. (See Figure A)
- Note 4:** Eject the disc, if loaded.
- Note 5:** Disconnect the power cord from the socket to shut off the power supply.



(Figure A)

CHECKS PRIOR TO PARTS REPLACEMENT AND ADJUSTMENTS

Before performing repairs, perform the following checks to determine the faulty locations up to a certain extent. Details of the procedures are described in “5 Electrical Adjustments”.

- 5-6-2. Laser power check (see page 26)
- 5-6-3. Iop Compare (see page 26)
- 5-6-4. Auto Check (see page 27)

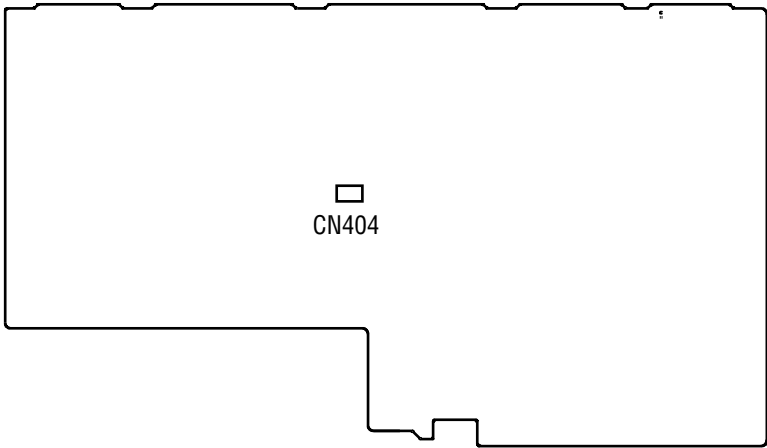
Note:
The criteria for determination above is intended merely to determine if satisfactory or not, and does not serve as the specified value for adjustments.
When performing adjustments, use the specified values for adjustments.

FORCED RESET

The system microprocessor can be reset in the following procedure.
Use these procedure when the unit cannot be operated normally due to the overrunning of the microprocessor, etc.

Procedure :
Remove the short-pin attached to CN404, and then attach it again.

[MAIN BOARD] (Component Side)



NOTES ON REPLACING BD BOARD OR MD MECHANISM DECK

In replacing the BD board or MD mechanism deck, perform the work through the steps provided below:

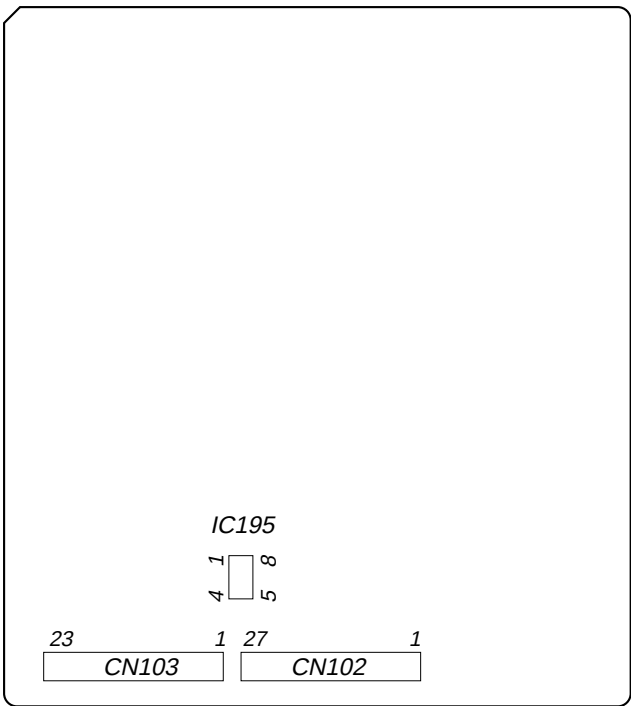
1. Remove the IC195 from the BD board to be replaced.
2. Remove the IC195 from new BD board.
3. Mount the IC195 on new BD board, which was removed from the BD board to be replaced.
4. Install new BD board in the set.

Note: The IC195 cannot be replaced with a new part.

OPERATION CHECK IN NORMAL MODE

Aiso in checking the recording and other functions, connect the set to the PC with a USB cable and perform the operation on the application software “OpenMG Jukebox” attached.

– BD BOARD (Conductor Side) –



RETRY CAUSE DISPLAY MODE

- In this test mode, the causes for retry of the unit during recording can be displayed on the fluorescent indicator tube. During playback, the “track mode” for obtaining track information will be set. This is useful for locating the faulty part of the unit.
- The following will be displayed :
During recording and stop : Retry cause, number of retries, and number of retry errors.
During playback : Information such as type of disc played, part played, copyright.
These are displayed in hexadecimal.

Procedure:

1. Insert the recordable disc.
2. Press **MENU/NO** button to display “Edit Menu” on the fluorescent display.
3. Turn **◀◀ AMS ▶▶** knob to display “All Erase?” on the fluorescent display.
4. Press **YES** button or **◀◀ AMS ▶▶** knob to display “All Erase??” on the fluorescent display.
5. Press **YES** button, “Complete!” is displayed on the fluorescent display and it turns off immediately.
6. Procedure 1: Press the **■** button continuously for about 10 seconds.
Procedure 2: Press the **LEVEL/DISPLAY/CHAR** button while pressing the **■** button and **MENU/NO** button.
7. When the mode is set, “RTs 00c 00e 000” is displayed.
8. Press the **● REC** button to start recording. Then press the **||** button and start recording.
9. To check the “track mode”, press the **▷** button to start play.
10. To exit the test mode, press the **I/O** button, and turn OFF the power. When “TOC” disappears, disconnect the power plug from the outlet.
If the test mode cannot be exited, refer to “Forced Reset” on page 8.

**Fig. 1 Reading the Test Mode Display
(During recording and stop)**

RTs@@c##e***

Fluorescent display tube display

@@ : Cause of retry
: Number of retries
*** : Number of retry errors

**Fig. 2 Reading the Test Mode Display
(During playback)**

@@####**\$\$

Fluorescent display tube display

@@ : Parts No. (name of area named on TOC)
: Cluster } Address (Physical address on disc)
** : Sector
\$\$: Track mode (Track information such as copyright information of each part)

Reading the Retry Cause Display

	Higher Bits				Lower Bits				Hexa-decimal	Cause of Retry	Occurring conditions
Hexadecimal	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0			
Binary	0	0	0	0	0	0	0	1	01	shock	When track jump (shock) is detected
	0	0	0	0	0	0	1	0	02	ader5	When ADER was counted more than five times continuously
	0	0	0	0	0	1	0	0	04	Discontinuous address	When ADIP address is not continuous
	0	0	0	0	1	0	0	0	08	DIN unlock	When DIN unlock is detected
	0	0	0	1	0	0	0	0	10	FCS incorrect	When not in focus
	0	0	1	0	0	0	0	0	20	IVR rec error	When ABCD signal level exceeds the specified range
	0	1	0	0	0	0	0	0	40	CLV unlock	When CLV is unlocked
	1	0	0	0	0	0	0	0	80	Access fault	When access operation is not performed normally

Reading the Display:

Convert the hexadecimal display into binary display.
If more than two causes, they will be added.

Example

When 42 is displayed:
Higher bit : 4 = 0100 → b6
Lower bit : 2 = 0010 → b1
In this case, the retry cause is combined of “CLV unlock” and “ader5”.

When A2 is displayed:
Higher bit : A = 1010 → b7+b5
Lower bit : 2 = 0010 → b2
The retry cause in this case is combined of “access fault”, “IVR rec error”, and “ader5”.

Hexadecimal → Binary Conversion Table

Hexadecimal	Binary	Hexadecimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

Reading the Track Mode Display

	Higher Bits				Lower Bits				Hexa- decimal	Details	
Hexadecimal	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0		When 0	When 1
Binary	0	0	0	0	0	0	0	1	01	Emphasis OFF	Emphasis ON
	0	0	0	0	0	0	1	0	02	Monaural	Stereo
	0	0	0	0	0	1	0	0	04	This is 2-bit display. Normally 01. 01:Normal audio. Others:Invalid	
	0	0	0	0	1	0	0	0	08		
	0	0	0	1	0	0	0	0	10	Audio (Normal)	Invalid
	0	0	1	0	0	0	0	0	20	Original	Digital copy
	0	1	0	0	0	0	0	0	40	Copyright	No copyright
	1	0	0	0	0	0	0	0	80	Write prohibited	Write allowed

Reading the Display:

Convert the hexadecimal display into binary display. If more than two causes, they will be added.

Example When 84 is displayed:

Higher bit : 8 = 1000 → b7

Lower bit : 4 = 0100 → b2

In this case, as b2 and b7 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis OFF”, “monaural”, “original”, “copyright exists”, and “write allowed”.

Example When 07 is displayed:

Higher bit : 0 = 1000 → All 0

Lower bit : 7 = 0111 → b0+b1+b2

In this case, as b0, b1, and b2 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis ON”, “stereo”, “original”, “copyright exists”, and “write prohibited”.

Hexadecimal → Binary Conversion Table

Hexadecimal	Binary	Hexadecimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

SECTION 2 GENERAL

This section is extracted from instruction manual.

Main unit

ALPHABETICAL ORDER

A - M

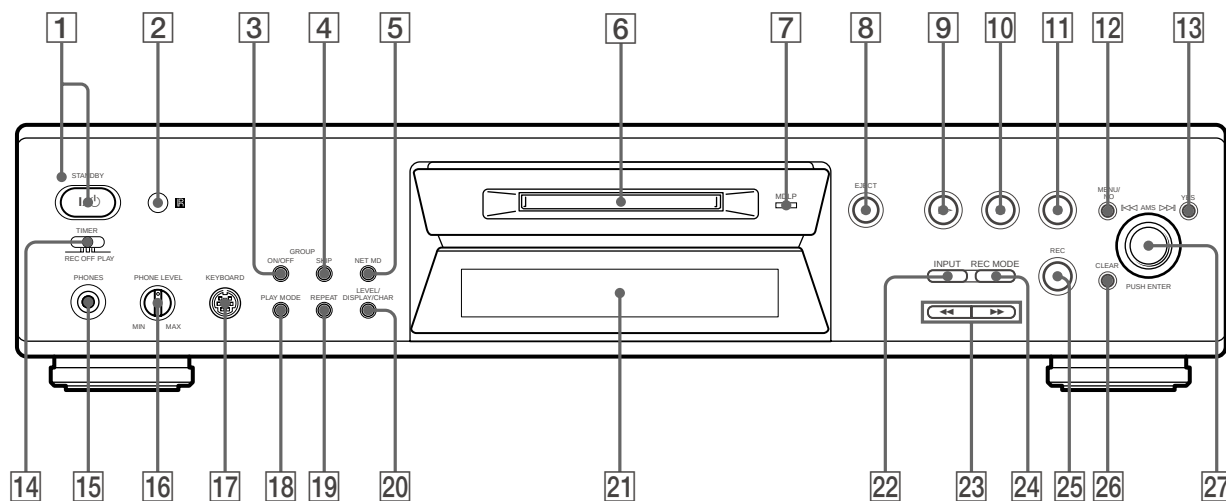
AMS **27** (14) (21) (27) (39) (43)
 CLEAR **26** (24) (33) (43)
 Display window **21**
 EJECT **8** (10) (21) (26)
 GROUP ON/OFF **3** (11) (23) (34)
 GROUP SKIP **4** (12) (23) (34)
 INPUT **22** (10)
 KEYBOARD jack **17** (43)
 LEVEL/DISPLAY/CHAR **20** (10) (16) (21) (32)
 MD insertion slot **6** (10) (20)
 MDLP indicator **7** (14) (21)
 MENU/NO **12** (14) (21) (26) (39) (43)

N - Y

NET MD **5** (9)
 PHONE LEVEL **16** (21)
 PHONES jack **15** (17) (21) (40)
 PLAY MODE **18** (20) (42)
 REC MODE **24** (13)
 REC **25** (10) (14) (17)
 Remote sensor **2** (8)
 REPEAT **19** (20)
 STANDBY indicator **1** (10) (20)
 TIMER **14** (42)
 YES **13** (14) (25) (27) (39) (43)

BUTTON DESCRIPTIONS

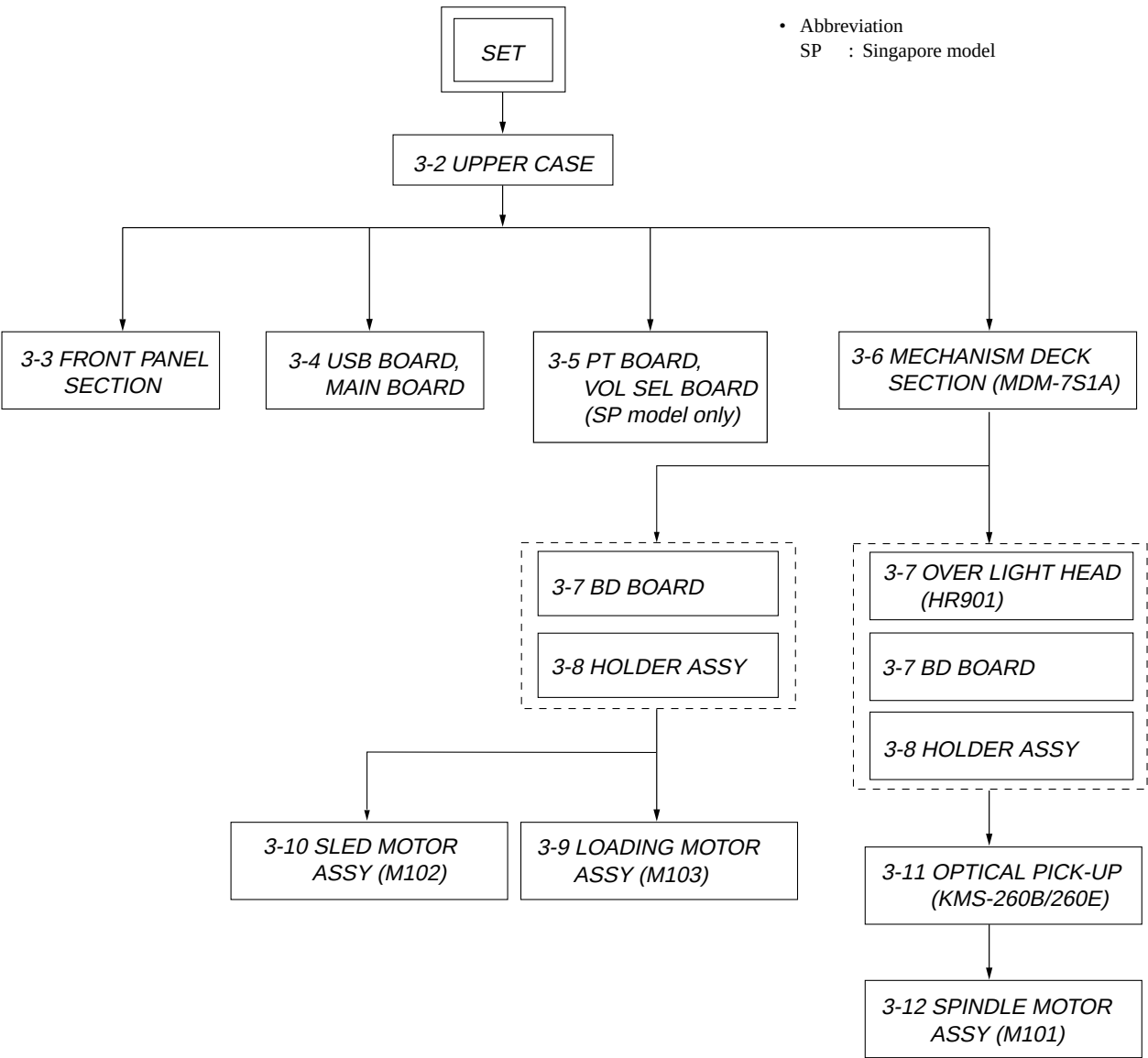
I/⏻ **1** (10) (20) (26)
 ▷ **9** (10) (20) (42) (44)
 || **10** (10) (21) (44)
 ■ **11** (10) (21) (26) (42) (44)
 ◀◀/▶▶ **23** (21) (28) (44)



SECTION 3
DISASSEMBLY

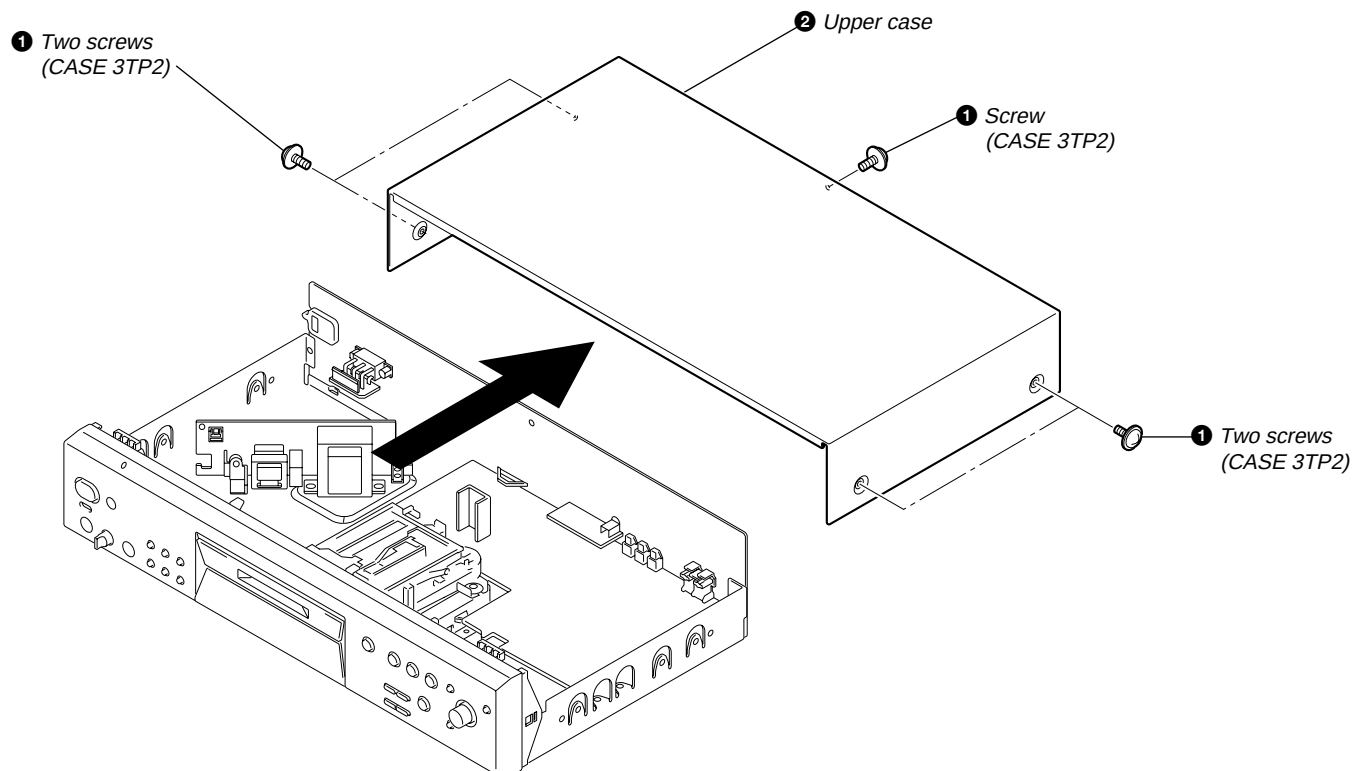
• This set can be disassembled in the order shown below.

3-1. DISASSEMBLY FLOW

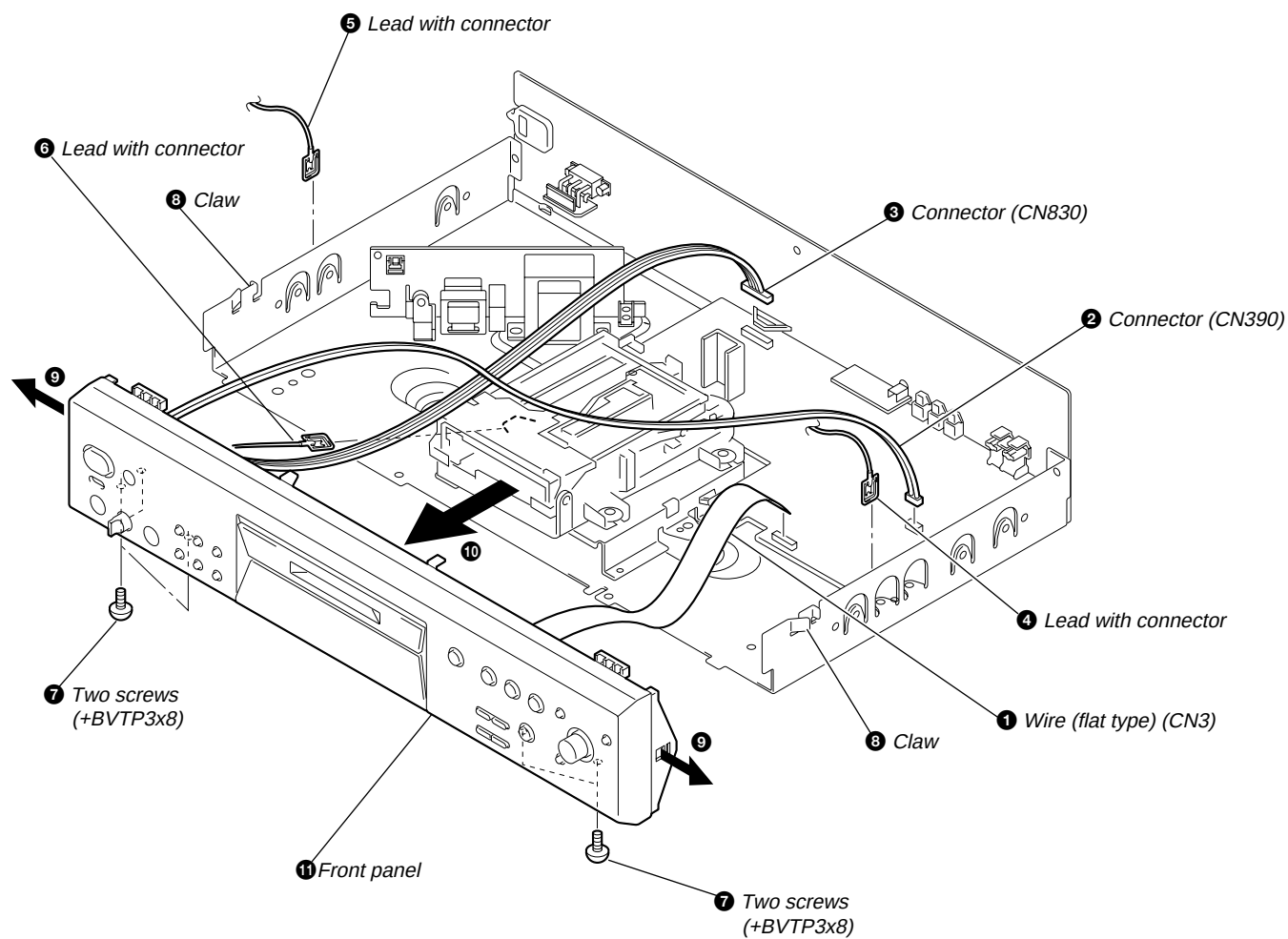


Note 1: The processes enclosed with [- - -], remove in the any order.
Note 2: You cannot go to the next process until every process enclosed with [- - -] has done.

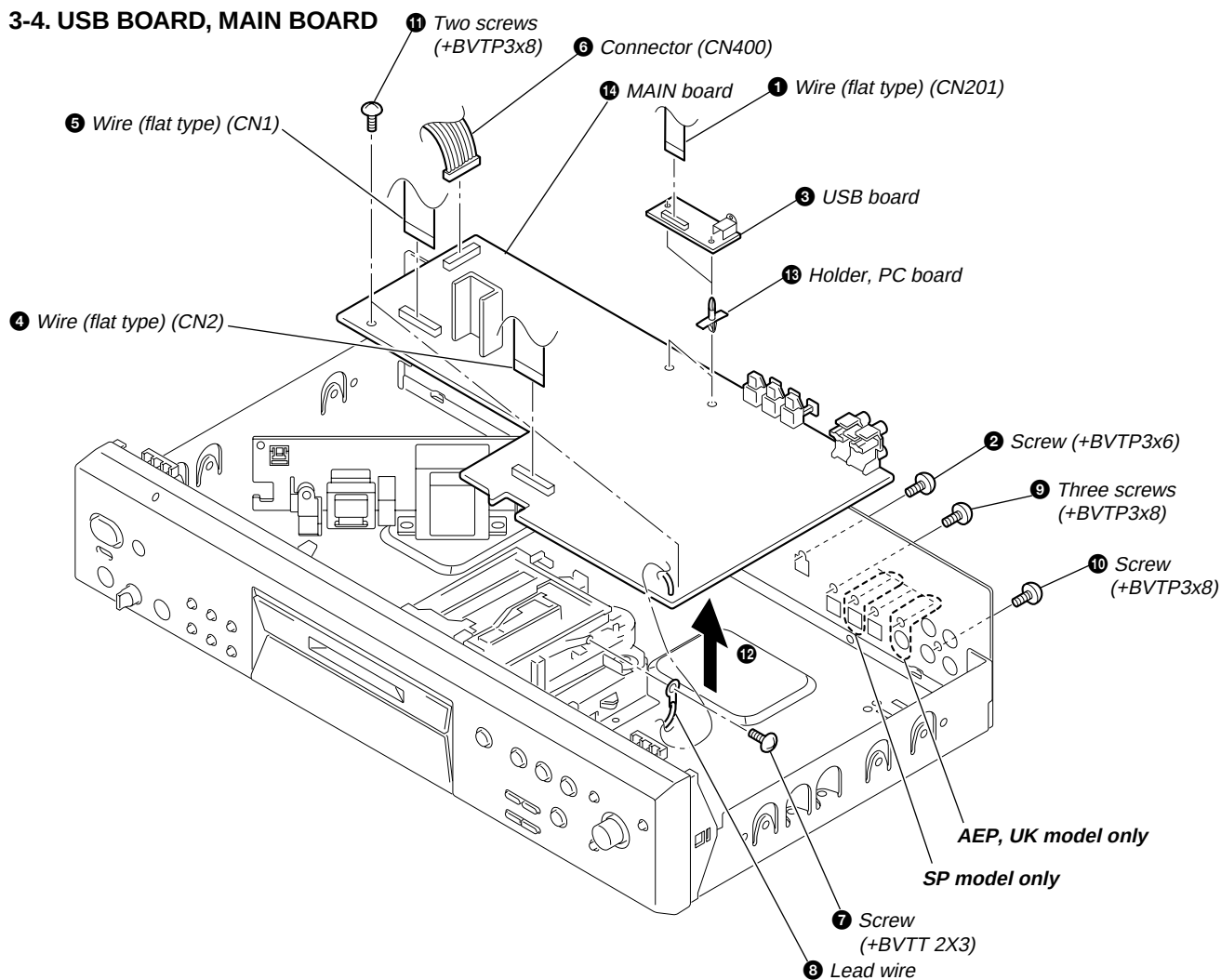
3-2. UPPER CASE



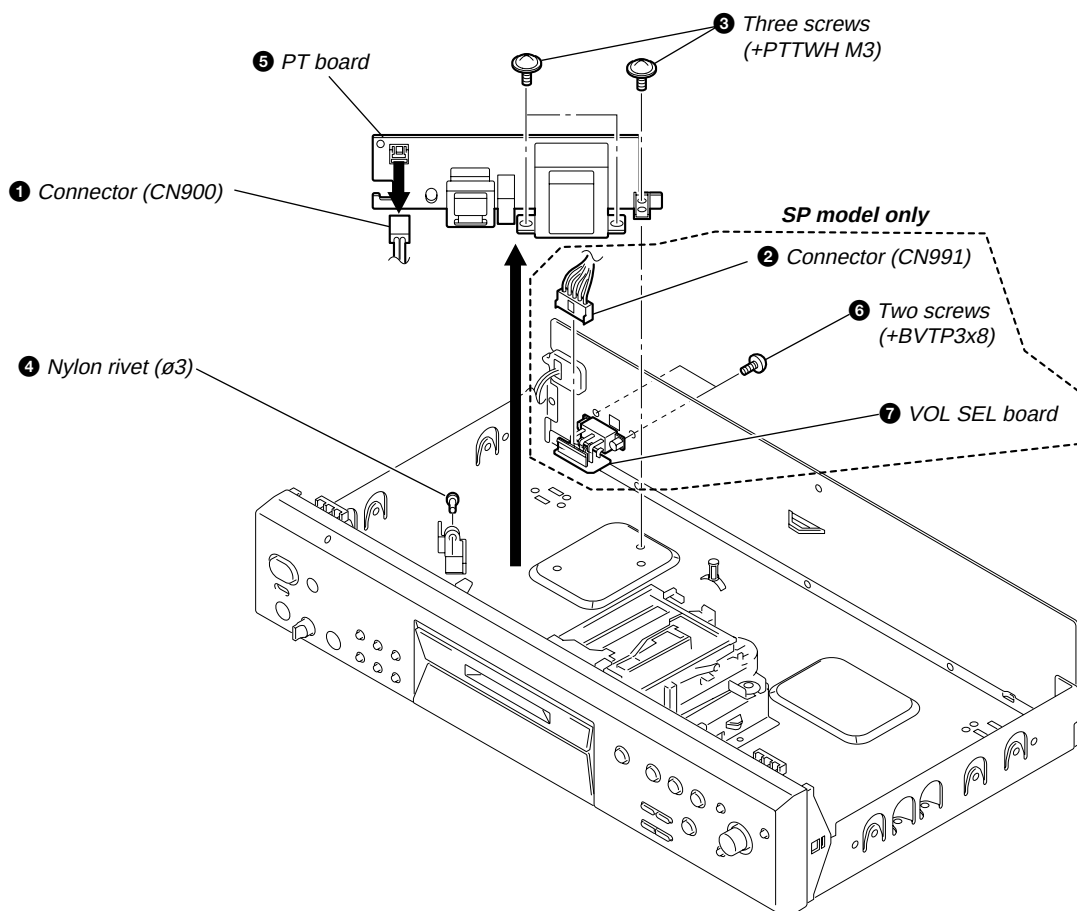
3-3. FRONT PANEL SECTION



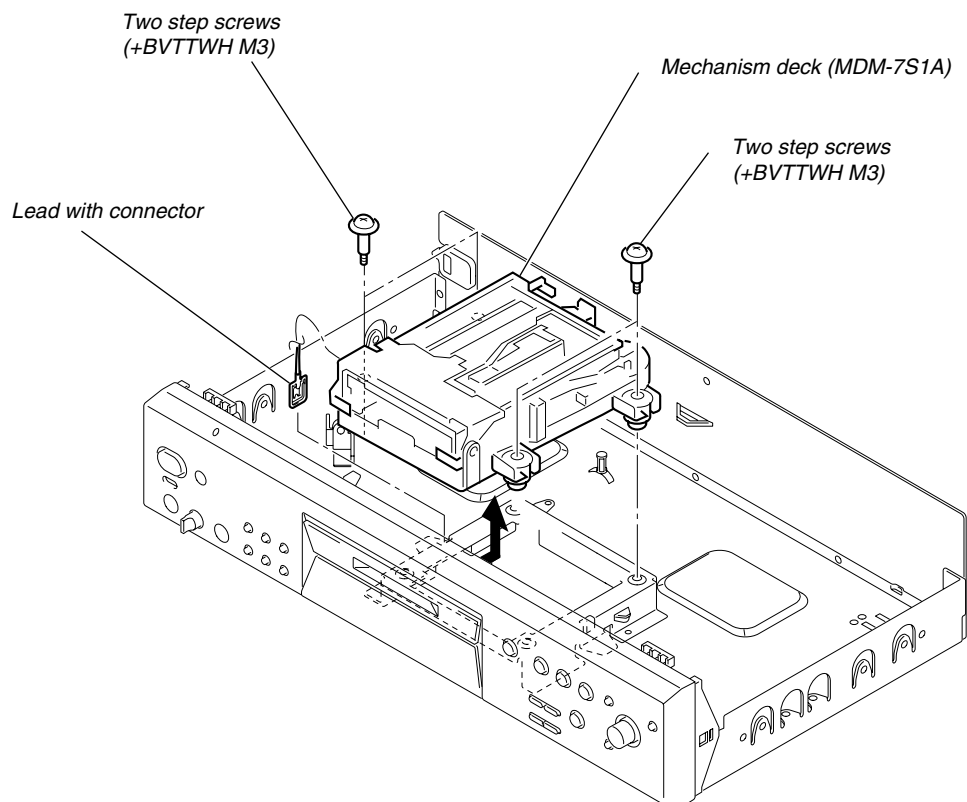
3-4. USB BOARD, MAIN BOARD



3-5. PT BOARD, VOL SEL BOARD (SP model only)



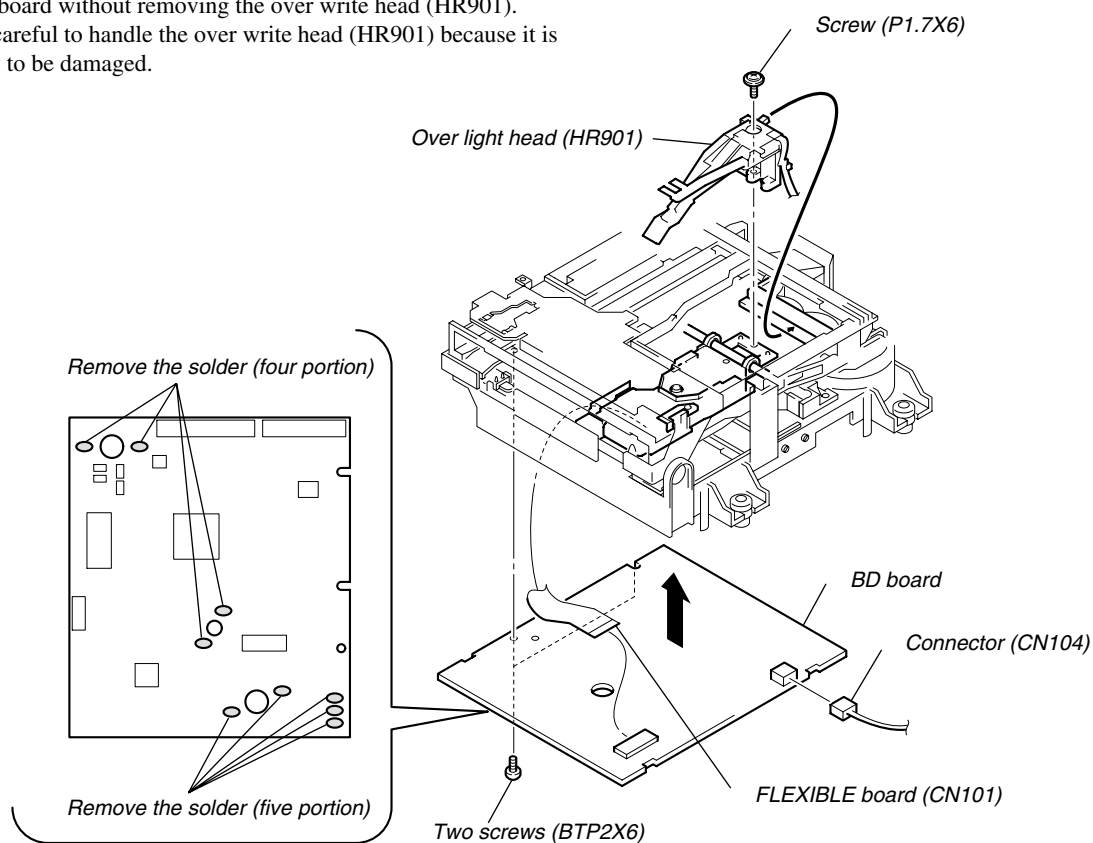
3-6. MECHANISM DECK SECTION (MDM-7S1A)



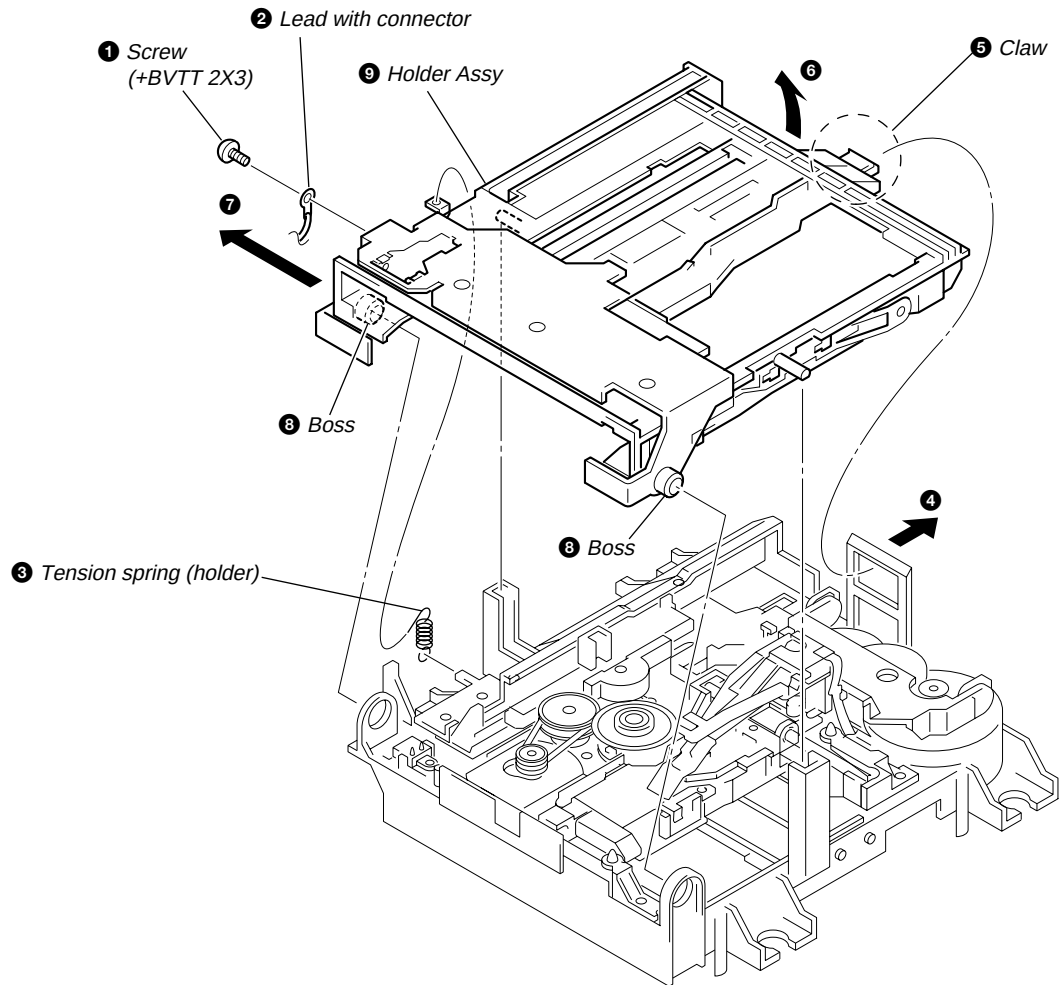
3-7. OVER LIGHT HEAD (HR901), BD BOARD

Note 1: If you disconnect the connector (CN104), you can remove the BD board without removing the over write head (HR901).

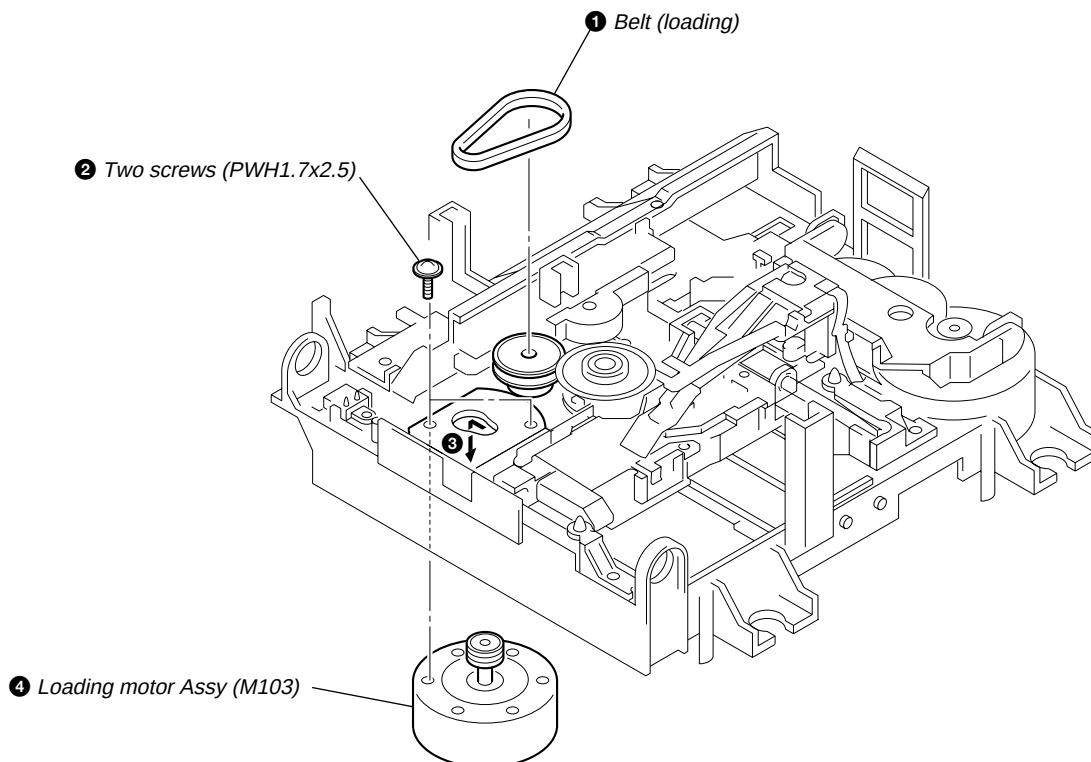
Note 2: Be careful to handle the over write head (HR901) because it is easy to be damaged.



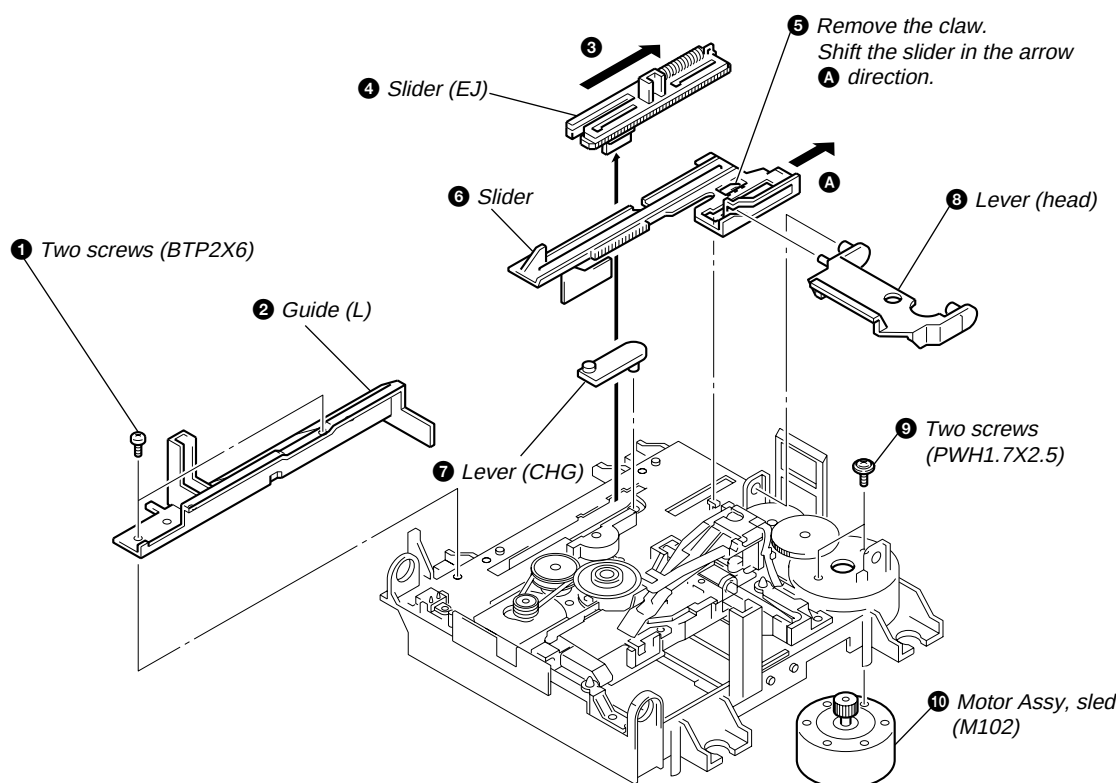
3-8. HOLDER ASSY



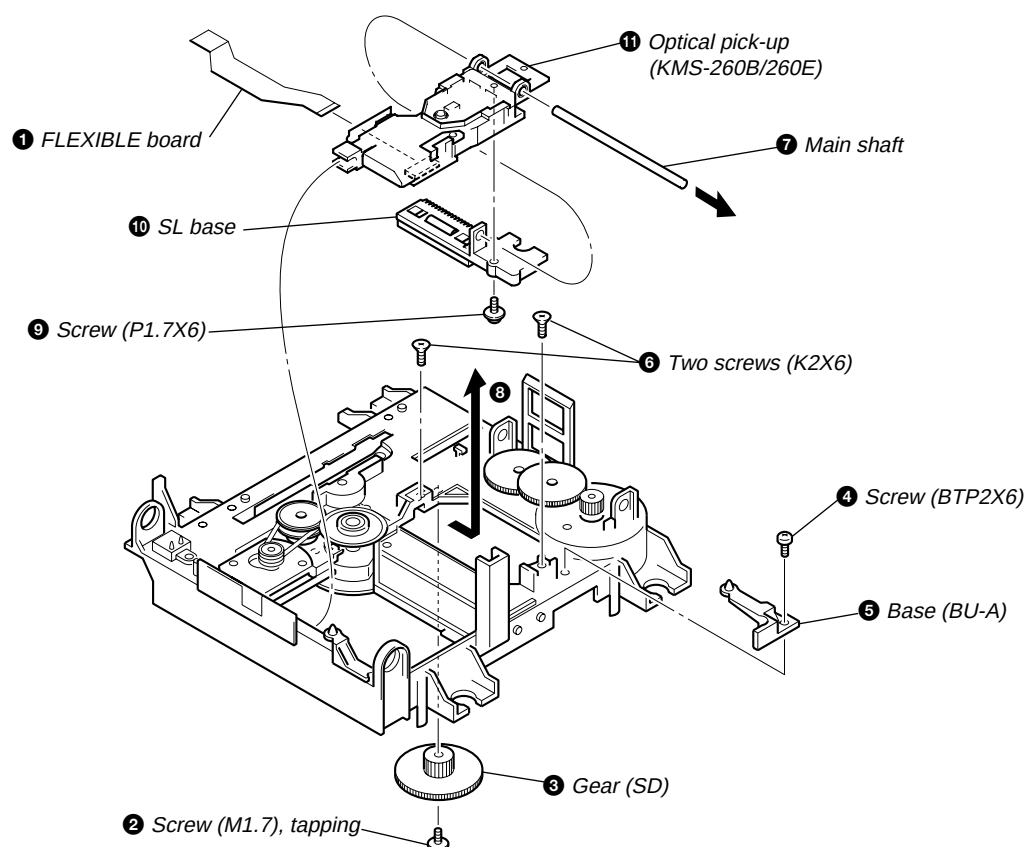
3-9. LOADING MOTOR ASSY (M103)



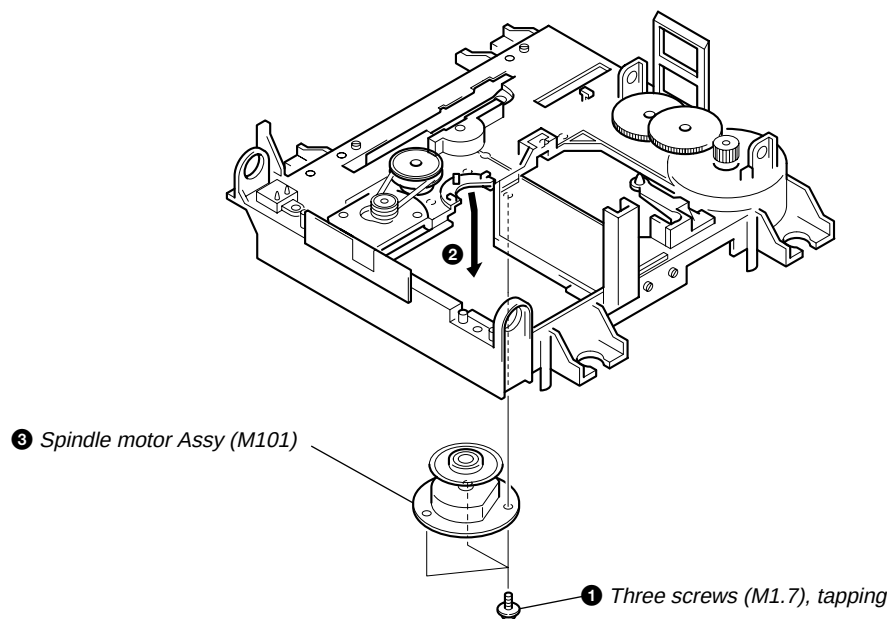
3-10. SLED MOTOR ASSY (M102), SLIDER



3-11. OPTICAL PICK-UP (KMS-260B/260E)

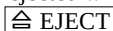


3-12. SPINDLE MOTOR ASSY (M101)



SECTION 4 TEST MODE

4-1. PRECAUTIONS FOR USE OF TEST MODE

- As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.
Even if the  button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.
Therefore, it will be ejected while rotating.
Be sure to press the  button after pressing the  button and the rotation of disc is stopped.

4-1-1. Recording laser emission mode and operating buttons

- Continuous recording mode (CREC 1MODE) (C35)
- Laser power check mode (LDPWR CHECK) (C13)
- Laser power adjustment mode (LDPWR ADJUST) (C04)
- Iop check (Iop Compare) (C27)
- Iop value nonvolatile writing (Iop NV Save) (C06)
- Traverse (MO) check (EF MO CHECK) (C14)
- Traverse (MO) adjustment (EF MO ADJUST) (C07)
- When pressing the  button.

4-2. SETTING THE TEST MODE

The following are two methods of entering the test mode.

Procedure 1: While pressing the  knob and  button, connect the power plug to an outlet, and release the  knob and  button.

When the test mode is set, “[Check]” will be displayed. Rotating the  knob switches between the following three groups; ... ↔ Check ↔ Service ↔ Develop ↔

Procedure 2: While pressing the  knob, connect the power plug to the outlet and release the  knob.
When the test mode is set, “TEMP CHECK” will be displayed. By setting the test mode using this method, only the “Check” group of method 1 can be executed.

NOTE: Do not use the test mode in the [Develop] group.

If used, the unit may not operate normally.

If the [Develop] group is set accidentally, press the  button immediately to exit the [Develop] group.

4-3. EXITING THE TEST MODE

Press the  button. The disc is ejected when loaded, and “Standby” display blinks, and the STANDBY state is set.

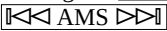
4-4. BASIC OPERATIONS OF THE TEST MODE

All operations are performed using the  knob,  button, and  button.

The functions of these buttons are as follows.

Function name		Function
MENU/NO button		Cancel or move to top hierarchy
YES button		Set
AMS knob	Left or Right	Select
	Push	Set submenu

4-5. SELECTING THE TEST MODE

There are 25 types of test modes as shown below. The groups can be switched by rotating the  knob. After selecting the group to be used, press the  button. After setting a certain group, rotating the  knob switches between these modes. Refer to “Group” in the table for details selected.

All adjustments and checks during servicing can be performed in the test mode in the Service group.

NOTE: Do not use the test mode in the [Develop] group.

If used, the unit may not operate normally.

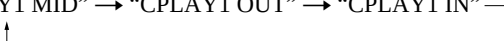
If the [Develop] group is set accidentally, press the  button immediately to exit the [Develop] group.

Display	No.	Details	Mark	Group	
				Check	Service
AUTO CHECK	C01	Automatic self-diagnosis			○
Err Display	C02	Error history display, clear			○
TEMP ADJUS	C03	Temperature compensation offset adjustment			○
LDPWR ADJUS	C04	Laser power adjustment			○
Iop Write	C05	Iop data writing			○
Iop NV Save	C06	Writes current Iop value in read nonvolatile memory using microprocessor			○
EF MO ADJUS	C07	Traverse (MO) adjustment			○
EF CD ADJUS	C08	Traverse (CD) adjustment			○
FBIAS ADJUS	C09	Focus bias adjustment			○
AG Set (MO)	C10	Focus, tracking gain adjustment (MO)			○
AG Set (CD)	C11	Focus, tracking gain adjustment (CD)			○
TEMP CHECK	C12	Temperature compensation offset check		○	○
LDPWR CHECK	C13	Laser power check		○	○
EF MO CHECK	C14	Traverse (MO) check		○	○
EF CD CHECK	C15	Traverse (CD) check		○	○
FBIAS CHECK	C16	Focus bias check		○	○
ScurveCHECK	C17	S-curve check	×	○	
VERIFYMODE	C18	Nonvolatile memory check	×	○	
DETRK CHECK	C19	Detrack check	×	○	
0920 CHECK	C25	Most circumference check	×	○	
Iop Read	C26	Iop data display		○	○
Iop Compare	C27	Comparison with initial Iop value written in nonvolatile memory		○	○
ADJ CLEAR	C28	Initialization of nonvolatile memory for adjustment values			○
INFORMATION	C31	Display of microprocessor version, etc.		○	○
CPLAY1MODE	C34	Continuous playback mode		○	○
CREC 1MODE	C35	Continuous recording mode		○	○

- For details of each adjustment mode, refer to “5. Electrical Adjustments”.
- For details of “Err Display”, refer to “Self-Diagnosis Function” on page 3.
- If a different mode has been selected by mistake, press the **MENU/NO** button to exit that mode.
- Modes with (X) in the Mark column are not used for servicing and therefore are not described in detail. If these modes are set accidentally, press the **MENU/NO** button to exit the mode immediately.

4-5-1. Operating the Continuous Playback Mode

- Entering the continuous playback mode
 - ① Set the disc in the unit. (Whichever recordable discs or discs for playback only are available.)
 - ② Rotate the **◀AMS▶** knob and display “CPLAY1 MODE”(C34).
 - ③ Press the **YES** button to change the display to “CPLAY1 MID”.
 - ④ When access completes, the display changes to “C = 0000 AD = 00”.

Note : The numbers “0” displayed show you error rates and ADER.
- Changing the parts to be played back
 - ① Press the **YES** button during continuous playback to change the display as below.
 “CPLAY1 MID” → “CPLAY1 OUT” → “CPLAY1 IN”


When pressed another time, the parts to be played back can be moved.

 - ② When access completes, the display changes to “C = 0000 AD = 00”.

Note : The numbers “0” displayed show you error rates and ADER.
- Ending the continuous playback mode
 - ① Press the **MENU/NO** button. The display will change to “CPLAY1 MODE”(C34).
 - ② Press the **EJECT** button to remove the disc.

Note : The playback start addresses for IN, MID, and OUT are as follows.

IN 40h cluster
 MID 300h cluster
 OUT 700h cluster

4-5-2. Operating the Continuous Recording Mode (Use only when performing self-recording/playback check.)

1. Entering the continuous recording mode

- ① Set a recordable disc in the unit.
- ② Rotate the **AMS** knob and display “CREC 1MODE” (C35).
- ③ Press the **YES** button to change the display to “CREC1 MID”.
- ④ When access completes, the display changes to “CREC 1 ()” and **REC** lights up.

Note : The numbers “ ” displayed shows you the recording position addresses.

2. Changing the parts to be recorded

- ① When the **YES** button is pressed during continuous recording, the display changes as below.

“CREC1 MID” → “CREC1 OUT” → “CREC1 IN”

When pressed another time, the parts to be recorded can be changed. **REC** goes off.

- ② When access completes, the display changes to “CREC 1 ()” and **REC** lights up.

Note : The numbers “ ” displayed shows you the recording position addresses.

3. Ending the continuous recording mode

- ① Press the **MENU/NO** button. The display changes to “CREC1 MODE” (C35) and **REC** goes off.
- ② Press the **EJECT** button to remove the disc.

Note 1 : The recording start addresses for IN, MID, and OUT are as follows.

IN 40h cluster
MID 300h cluster
OUT 700h cluster

Note 2 : The **MENU/NO** button can be used to stop recording anytime.

Note 3 : Do not perform continuous recording for long periods of time above 5 minutes.

Note 4 : During continuous recording, be careful not to apply vibration.

4-6. FUNCTIONS OF OTHER BUTTONS

Function	Contents
▷	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶	The sled moves to the outer circumference only when this is pressed.
◀◀	The sled moves to the inner circumference only when this is pressed.
REC MODE	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLV S ↔ CLV A).
LEVEL/DISPLAY/CHAR	Switches the displayed contents each time the button is pressed.
⊞	Ejects the disc.
REPEAT	Exits the test mode.

4-7. TEST MODE DISPLAYS

Each time the **LEVEL/DISPLAY/CHAR** button is pressed, the display changes in the following order.

When CPLAY and CREC are started, the display will forcibly be switched to the error rate display as the initial mode.

1. Mode display

Displays “TEMP ADJUS” (C03), “CPLAY1MODE” (C34), etc.

2. Error rate display

Displays the error rate in the following way.

C = □□□□ AD = □□

C = Indicates the C error.

AD = Indicates ADER.

3. Address display

The address is displayed as follows. (MO:recordable disc, CD:playback only disc)

If the **REC MODE** button is pressed, the display switches from groove to pit or vice versa.

h = □□□□ s = □□□□ (MO pit and CD)

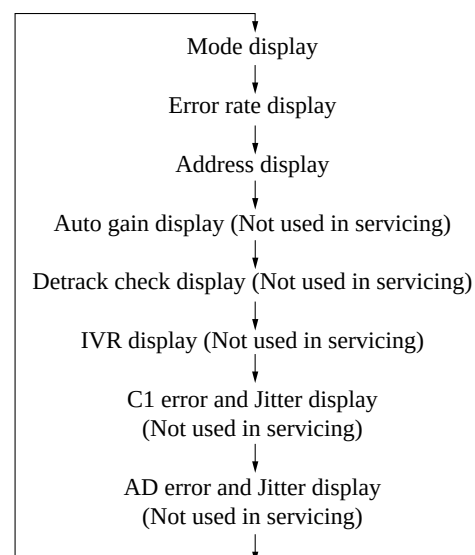
h = □□□□ a = □□□□ (MO groove)

h = Indicates the header address.

s = Indicates the SUBQ address.

a = Indicates the ADIP address.

Note: “-” is displayed when the address cannot be read.



4-8. MEANINGS OF OTHER DISPLAYS

Display	Contents	
	When Lit	When Off
▷	Servo ON	Servo OFF
II	Tracking servo OFF	Tracking servo ON
REC	Recording mode ON	Recording mode OFF
SYNC	CLV low speed mode	CLV normal mode
L.SYNC	ABCD adjustment completed	
OVER	Tracking offset cancel ON	Tracking offset cancel OFF
B/1	Tracking auto gain OK	
A-/REP	Focus auto gain OK	
TRACK/(LP4)/calender fram	Pit	Groove
DISC/LP2	High reflection	Low reflection
SLEEP/SHUF	CLV S	CLV A
MONO	CLV LOCK	CLV UNLOCK

4-9. AUTOMATIC SELF-DIAGNOSIS FUNCTION

This test mode performs CREC and CPLAY automatically for mainly checking the characteristics of the optical pick-up.

To perform this test mode, the laser power must first be checked.

Perform AUTO CHECK after the laser power check and Iop check.

Procedure

1. Press the **YES** button. If “LDPWR ミチェック ” is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disc is in the mechanical deck, it will be ejected forcibly.
“DISC IN” will be displayed in this case. Load a test disc (MDW-74/GA1) which can be recorded.
3. If a disk is loaded at step 2, the check will start automatically.
4. When “XX CHECK” is displayed, the item corresponding to XX will be performed.
When “06 CHECK” completes, the disc loaded at step 2 will be ejected. “DISC IN” will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded in step 4, the check will automatically be resumed from “07 CHECK”.
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, “CHECK ALL OK” will be displayed. If any item is NG, it will be displayed as “NG:xxxx”.

When “CHECK ALL OK” is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.

When displayed as “NG:xxxx”, it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

4-10. INFORMATION

Display the software version.

Procedure

1. If displayed as “INFORMATION”, press the **YES** button.
2. The software version will be displayed.
3. Press the **MENU/NO** button to end this mode.

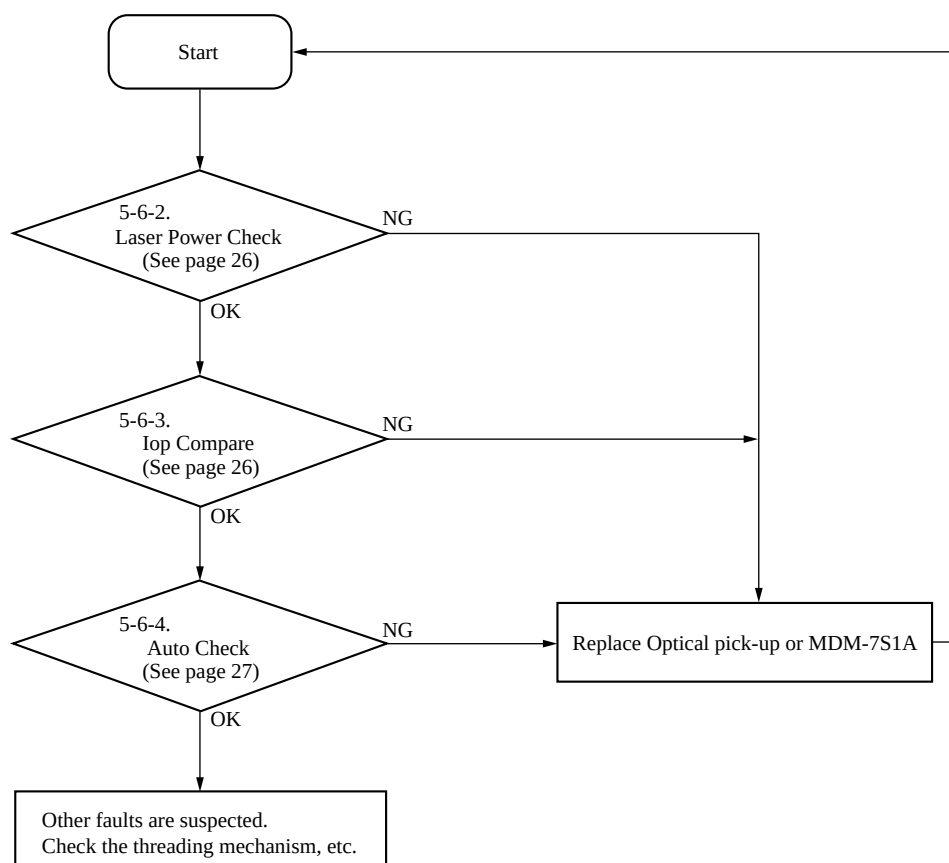
SECTION 5 ELECTRICAL ADJUSTMENTS

Note : 260B: KMS-260B
260E: KMS-260E

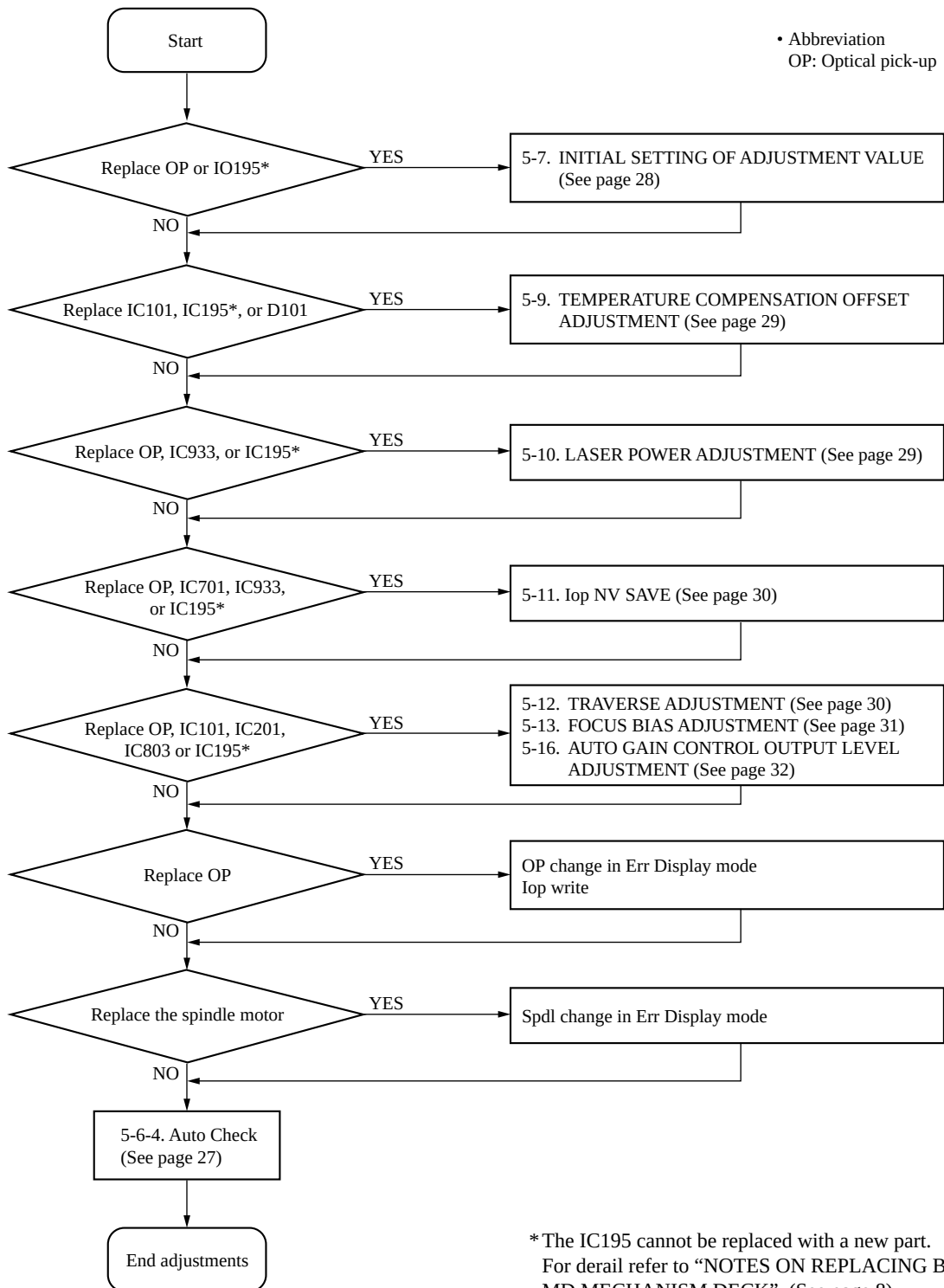
5-1. PARTS REPLACEMENT AND ADJUSTMENT

If malfunctions caused by Optical pick-up such as sound skipping are suspected, follow the following check.

Check before replacement



Adjustment flow

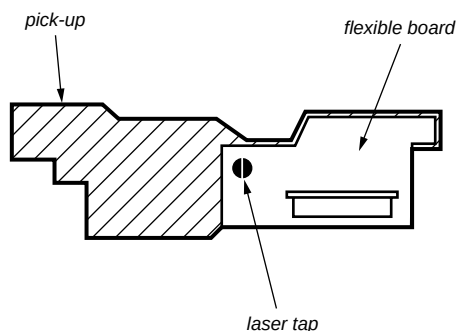


5-2. PRECAUTIONS FOR CHECKING LASER DIODE EMISSION

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

5-3. PRECAUTIONS FOR USE OF OPTICAL PICK-UP (KMS-260B/260E)

As the laser diode in the optical pick-up is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



Optical pick-up flexible board

5-4. PRECAUTIONS FOR ADJUSTMENTS

- 1) When replacing the following parts, perform the adjustments and checks with ○ in the order shown in the following table.
- 2) Set the test mode when performing adjustments.
After completing the adjustments, exit the test mode.
Perform the adjustments and checks in “group S” of the test mode.
- 3) Perform the adjustments to be needed in the order shown.
- 4) Use the following tools and measuring devices.
 - Check Disc (MD) TDYS-1 (Parts No. 4-963-646-01)
 - Test Disk (MDW-74/GA-1) (Parts No. 4-229-747-01)
 - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
 or
 MD Laser power meter 8010S (Parts No. J-2501-145-A)
 - Oscilloscope (Measure after performing CAL of prove.)
 - Digital voltmeter
 - Thermometer
 - Jig for checking BD board waveform (Parts No. : J-2501-196-A)
- 5) When observing several signals on the oscilloscope, etc., make sure that VC and ground do not connect inside the oscilloscope.
(VC and ground will become short-circuited.)
- 6) Using the above jig enables the waveform to be checked without the need to solder.
(Refer to Servicing Note on page 6.)
- 7) As the disc used will affect the adjustment results, make sure that no dusts nor fingerprints are attached to it.

Adjustment	Parts to be replaced							
	Optical Pick-up	IC101	IC701	IC201	IC933	IC195*	D101	IC803
5-7. Initial setting of adjustment values	○	×	×	×	×	○	×	×
5-8. Recording of Iop information	○	×	×	×	×	○	×	×
5-9. TEMP ADJUST	×	○	×	×	×	○	○	×
5-10. Laser power adjustment	○	×	×	×	○	○	×	×
5-11. Iop NV Save	○	×	○	×	○	○	×	×
5-12. Traverse adjustment	○	○	×	×	×	○	×	○
5-13. Focus bias adjustment	○	○	×	○	×	○	×	○
5-16. Auto gain adjustment	○	○	×	○	×	○	×	○
5-6-4. AUTO CHECK	○	○	×	○	○	○	×	○

*The IC195 cannot be replaced with a new part.

For detail refer to “NOTES ON REPLACING BD BOARD OR MD MECHANISM DECK” (See page 8).

5-5. USING THE CONTINUOUSLY RECORDED DISC

- * This disc is used in focus bias adjustment and error rate check.
The following describes how to create a continuous recording disc.
1. Insert a disc (blank disc) commercially available.
 2. Rotate the **◀◀ AMS ▶▶** knob and display “CREC1 MODE” (C35).
 3. Press the **YES** button again to display “CREC1 MID”.
 4. Press the **LEVEL/DISPLAY/CHAR** button.
Display “CREC (0300)” and start to recording.
 5. Complete recording within 5 minutes.
 6. Press the **MENU/NO** button and stop recording .
 7. Press the **EJECT** button and remove the disc.

The above has been how to create a continuous recorded data for the focus bias adjustment and error rate check.

Note :

- Be careful not to apply vibration during continuous recording.

5-6. CHECKS PRIOR TO REPAIRS

These checks are performed before replacing parts according to “approximate specifications” to determine the faulty locations. For details, refer to “Checks Prior to Parts Replacement and Adjustments” (See page 8).

5-6-1. Temperature Compensation Offset Check

When performing adjustments, set the internal temperature and room temperature to 22 to 28°C.

Checks cannot be performed properly if performed after some time from power ON due to the rise in the temperature of the IC and diode, etc. So, perform the checks again after waiting some time.

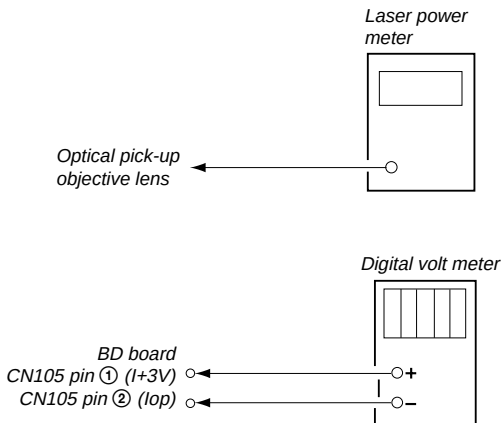
Checking Procedure:

1. Rotate the **◀◀ AMS ▶▶** knob to display “TEMP CHECK”. (C12)
2. Press the **YES** button.
3. “T=@@ (##) [OK]” should be displayed. If “T=@@ (##) [NG]” is displayed, it means that the results are bad.
(@@ indicates the current value set, and ## indicates the value written in the non-volatile memory.)

5-6-2. Laser Power Check

Before checking, check the Iop value of the optical pick-up.
(Refer to 5-8. Recording and Displaying Iop Information.)

Connection :



Checking Procedure:

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the **◀◀** button or **▶▶** button to move the optical pick-up.)
Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (Iop).
2. Then, rotate the **◀◀ AMS ▶▶** knob and display “LDPWR CHECK”.
3. Press the **YES** button once and display “L 0.93 mW \$ 000”.
Check that the reading of the laser power meter become the specified value.
4. Press the **YES** button once more and display “ L 7.25 mW \$ 000”. Check that the reading the laser power meter and digital volt meter satisfy the specified value.

Specified Value :

Laser power meter reading : L 0.93mW: 0.85-0.91mW (260B)
0.90-0.96mW (260E)
L 7.25mW: 6.80-7.20mW (260B)
7.00-7.50mW (260E)

Digital voltmeter reading : Optical pick-up displayed value ± 10%

(Optical pick-up label)

KMS260B
20101
H0576

(For details of the method for checking this value, refer to “5-8. Recording and Displaying Iop Information”.)

Iop = 57.6 mA in this case

Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

5. Press the **MENU/NO** button and display “LDPWR CHECK” and stop the laser emission.
(The **MENU/NO** button is effective at all times to stop the laser emission.)

Note 1: After step 4, each time the **YES** button is pressed, the display will be switched between “L 0.73 mW \$ 000”, “L 6.40 mW \$ 000”, and “L Wp ホセ イ 000”. Nothing needs to be performed here.

5-6-3. Iop Compare

The current Iop value at laser power 7 mw output and reference Iop value (set at shipment) written in the nonvolatile memory are compared, and the rate of increase/decrease will be displayed in percentage.

Note: Perform this function with the optical pick-up set at room temperature.

Procedure

1. Rotate the **◀◀ AMS ▶▶** knob to display “Iop Compare”.
2. Press the **YES** button and start measurements.
3. When measurements complete, the display changes to Iop [STOP] → Iop [7.0mW] → “±xx%yy”.
xx is the percentage of increase/decrease, and OK or NG is displayed at yy to indicate whether the percentage of increase/decrease is within the allowable range.
4. Press the **MENU/NO** button to end.

5-6-4. Auto Check

This test mode performs CREC and CPLAY automatically for mainly checking the characteristics of the optical pick-up. To perform this test mode, the laser power must first be checked. Perform Auto Check after the laser power check and Iop compare.

Procedure

1. Press the **[YES]** button. If “LDPWR ミチェック” is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disc is in the mechanical deck, it will be ejected forcibly. “DISC IN” will be displayed in this case. Load a test disc (MDW-74/GA1) which can be recorded.
3. If a disc is loaded at step 2, the check will start automatically.
4. When “XX CHECK” is displayed, the item corresponding to XX will be performed.
When “06 CHECK” completes, the disc loaded at step 2 will be ejected. “DISC IN” will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded, the check will automatically be resumed from “07 CHECK”.
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, “CHECK ALL OK” will be displayed. If any item is NG, it will be displayed as “NG:xxxx”.

When “CHECK ALL OK” is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.

When displayed as “NG:xxxx”, it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

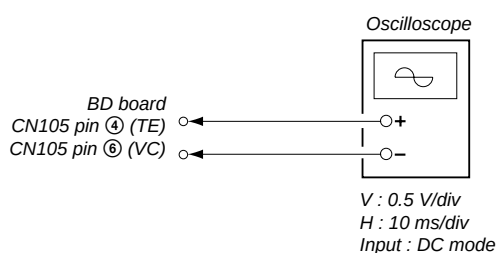
5-6-5. Other Checks

All the following checks are performed by the Auto Check mode. They therefore need not be performed in normal operation.

1. Load a continuously recorded test disc (MDW-74/GA1).
(Refer to “5-5. Using the Continuously Recorded Disc”.)

5-6-6. Traverse Check

Connection :

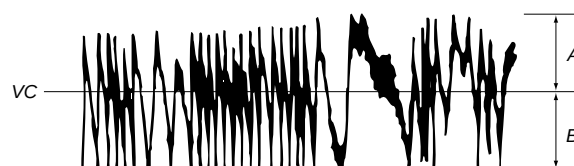


Checking Procedure:

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA1). (Refer to Note 1 (see page 28.)
3. Press the **[▶▶]** button and move the optical pick-up outside the pit.
4. Rotate the **[◀◀AMS▶▶]** knob and display “EF MO CHECK” (C14).
5. Press the **[YES]** button and display “EFB = **[MO-R]**”.
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)

6. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[AMS]** knob.
(Read power traverse checking)

(Traverse Waveform)



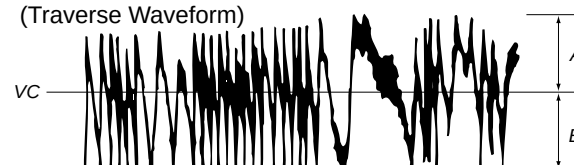
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

7. Press the **[YES]** button and display “EFB = **[MO-W]**”.
8. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[◀◀AMS▶▶]** knob.

(Write power traverse checking)

(Traverse Waveform)

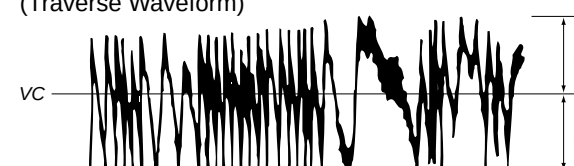


Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

9. Press the **[YES]** button display “EFB = **[MO-P]**”.
Then, the optical pick-up moves to the pit area automatically and servo is imposed.
10. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[◀◀AMS▶▶]** knob.

(Traverse Waveform)



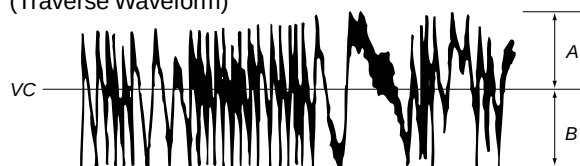
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

11. Press the **[YES]** button display “EF MO CHECK” (C14).
The disc stops rotating automatically.
12. Press the **[EJECT]** button and remove the disc.
13. Load the check disc (MD) TDYS-1.
14. Rotate the **[◀◀AMS▶▶]** knob and display “EF CD CHECK” (C15).
15. Press the **[YES]** button and display “EFB = **[CD]**”. Servo is imposed automatically.

16. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the  knob.

(Traverse Waveform)



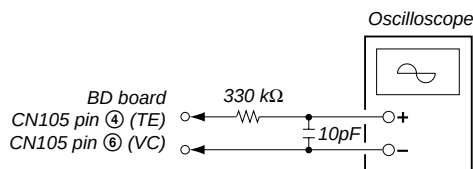
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

17. Press the  button and display “EF CD CHECK” (C15).
18. Press the  button and remove the check disc (MD) TDYS-1.

Note 1 : MO reading data will be erased during if a recorded disc is used in this adjustment.

Note 2 : If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



5-6-7. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

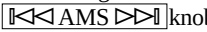
Checking Procedure :

- Load a continuously recorded test disc (MDW-74/GA1). (Refer to “5-5. Using the Continuously Recorded Disc”.)
- Rotate the  knob and display “CPLAY1 MODE”(C34).
- Press the  button and display “CPLAY1 MID”.
- The display change to “C = 0000 AD = 00”.
- Press the  button.
- Rotate the  knob and display “FBIAS CHECK”(C16).
- Press the  button and display “0000/00 c = 00”.
The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
Check that the C error is below 50 and ADER is below 2.
- Press the  button and display “0000/00 b = 00”.
Check that the C error is below 100 and ADER is below 2.
- Press the  button and display “0000/00 a = 00”.
Check that the C error is below 220 and ADER is below 2.
- Press the  button, next press the  button, and remove the test disc.

5-6-8. C PLAY Check

MO Error Rate Check

Checking Procedure :

- Load a continuously recorded test disc (MDW-74/GA1). (Refer to “5-5. Using the Continuously Recorded Disc”.)
- Rotate the  knob and display “CPLAY1 MODE”(C34).
- Press the  button and display “CPLAY1 MID”.
- The display changes to “C = 0000 AD = 00”.
- If the C error rate is below 50, check that ADER is 00.
- Press the  button, stop playback, press the  button, and test disc.

CD Error Rate Check

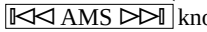
Checking Procedure :

- Load a check disc (MD) TDYS-1.
- Rotate the  knob and display “CPLAY1 MODE”(C34).
- Press the  button twice and display “CPLAY1 MID”.
- The display changes to “C = 0000 AD = 00”.
- Check that the C error rate is below 50.
- Press the  button, stop playback, press the  button, and the test disc.

5-6-9. Self-Recording/playback Check

Prepare a continuous recording disc using the unit to be repaired and check the error rate.

Checking Procedure :

- Insert a recordable test disc (MDW-74/GA1) into the unit.
- Rotate the  knob to display “CREC 1MODE”(C35).
- Press the  button to display the “CREC1 MID”.
- When recording starts, “REC” is displayed, this becomes “CREC 1 (@@@@)” (@@@@ is the address), and recording starts.
- About 1 minute later, press the  button to stop continuous recording.
- Rotate the  knob to display “CPLAY1MODE”(C34).
- Press the  button to display “C PLAY 1MID”.
- “C = 0000 AD = 00” will be displayed.
- Check that the C error becomes below 50 and the AD error below 2.
- Press the  button to stop playback, and press the  button and remove the disc.

5-7. INITIAL SETTING OF ADJUSTMENT VALUE

Note:

Mode which sets the adjustment results recorded in the non-volatile memory to the initial setting value. However the results of the temperature compensation offset adjustment will not change to the initial setting value.

If initial setting is performed, perform all adjustments again excluding the temperature compensation offset adjustment.

For details of the initial setting, refer to “5-4. Precautions on Adjustments” and execute the initial setting before the adjustment as required.

Setting Procedure :

- Rotate the  knob to display “ADJ CLEAR”(C28).
- Press the  button. “Complete!” will be displayed momentarily and initial setting will be executed, after which “ADJ CLEAR”(C28) will be displayed.

5-8. RECORDING AND DISPLAYING THE Iop INFORMATION

The Iop data can be recorded in the non-volatile memory. The Iop value on the label of the optical pick-up and the Iop value after the adjustment will be recorded. Recording these data eliminates the need to read the label on the optical pick-up.

Recording Procedure :

1. While pressing the [◀◀ AMS ▶▶] knob and [■] button, connect the power plug to the outlet, and release the [◀◌ AMS ▶▶] knob and [■] button.
2. Rotate the [◀◌ AMS ▶▶] knob to display “[Service]”, and press the [YES] button.
3. Rotate the [◀◌ AMS ▶▶] knob to display “Iop Write” (C05), and press the [YES] button.
4. The display becomes Ref=@@.@ (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the Iop value written on the optical pick-up.
To select the number : Rotate the [◀◌ AMS ▶▶] knob.
To select the digit : Press the [◀◌ AMS ▶▶] knob
6. When the [YES] button is pressed, the display becomes “Measu=@@.@” (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the [YES] button.
8. “Complete!” will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become “Iop Write” (C05).

Display Procedure :

1. Rotate the [◀◌ AMS ▶▶] knob to display “Iop Read” (C26).
2. “@@.@/##.##” is displayed and the recorded contents are displayed.
@@.@ indicates the Iop value labeled on the pick-up.
##.## indicates the Iop value after adjustment
3. To end, press the [◀◌ AMS ▶▶] button or [MENU/NO] button to display “Iop Read” (C26).

5-9. TEMPERATURE COMPENSATION OFFSET ADJUSTMENT

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature of 22 °C to 28 °C.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

Adjusting Procedure :

1. Rotate the [◀◌ AMS ▶▶] knob and display “TEMP ADJUS” (C03).
2. Press the [YES] button.
3. “TEMP = 00 [OK]” and the current temperature data will be displayed.
4. To save the data, press the [YES] button.
When not saving the data, press the [MENU/NO] button.
5. When the [YES] button is pressed, “TEMP = 00 SAVE” will be displayed and turned back to “TEMP ADJUS” (C03) display then. When the [MENU/NO] button is pressed, “TEMP ADJUS” (C03) will be displayed immediately.

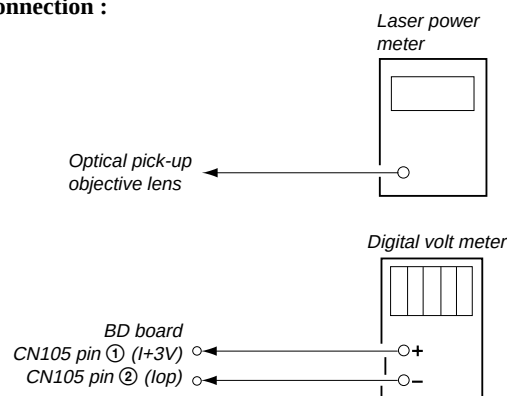
Specified Value :

The “TEMP = 00” should be within “E0 - EF”, “F0 - FF”, “00 - 0F”, “10 - 1F” and “20 - 2F”.

5-10. LASER POWER ADJUSTMENT

Check the Iop value of the optical pick-up before adjustments. (Refer to 5-8. Recording and Displaying Iop Information.)

Connection :



Adjusting Procedure :

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the [◀◌] button or [▶▶] button to move the optical pick-up.)
Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (Iop).
 2. Rotate the [◀◌ AMS ▶▶] knob and display “LDPWR ADJUS” (C04).
(Laser power : For adjustment)
 3. Press the [YES] button once and display “L 0.93 mW \$ 00”.
 4. Rotate the [◀◌ AMS ▶▶] knob so that the reading of the laser power meter becomes the specified value. Press the [YES] button after setting the range knob of the laser power meter, and save the adjustment results. (“L SAVE \$ 00” will be displayed for a moment.)
 5. Then “L 7.25 mW \$ 00” will be displayed.
 6. Rotate the [◀◌ AMS ▶▶] knob so that the reading of the laser power meter becomes the specified value, press the [YES] button and save it.
- Note :** Do not perform the emission with 7.25 mW more than 15 seconds continuously.
7. Then, rotate the [◀◌ AMS ▶▶] knob and display “LDPWR CHECK” (C13).
 8. Press the [YES] button once and display “L 0.93 mW \$ 00”. Check that the reading of the laser power meter become the specified value.
 9. Press the [YES] button once more and display “L 7.25 mW \$ 00”. Check that the reading the laser power meter and digital volt meter satisfy the specified value.
Note down the digital voltmeter reading value.

Specified Value :

Laser power meter reading : L 0.93mW : 0.85-0.91mW (260B)
0.90-0.96mW (260E)
L 7.25mW : 6.90-7.10mW (260B)
7.20-7.30mW (260E)

Digital voltmeter reading : Optical pick-up displayed value ± 10%

(Optical pick-up label)

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(For details of the method for checking this value, refer to “5-8. Recording and Displaying Iop Information”.)

Iop = 57.6 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

10. Press the **MENU/NO** button and display "LDPWR CHECK" and stop the laser emission.
(The **MENU/NO** button is effective at all times to stop the laser emission.)
11. Rotate the **AMS** knob to display "Iop Write" (C05).
12. Press the **YES** button. When the display becomes Ref = @@@.@@ (@ is an arbitrary number), press the **YES** button to display "Measu=@@@.@" (@ is an arbitrary number).
13. The numbers which can be changed will blink. Input the Iop value noted down at step 9.
To select the number : Rotate the **AMS** knob.
To select the digit : Press the **AMS** knob
14. When the **YES** button is pressed, "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write" (C05).

Note 1: After step 9, each time the **YES** button is pressed, the display will be switched between "L 0.73 mW \$ \$\$\$", "L 6.40 mW \$ \$\$\$", and "L Wp ホセ イ \$ \$\$\$". Nothing needs to be performed here.

5-11. Iop NV SAVE

Write the reference values in the nonvolatile memory to perform "Iop compare". As this involves rewriting the reference values, do not perform this procedure except when adjusting the laser power during replacement of the OP and when replacing the IC701. Otherwise the OP check may deteriorate.

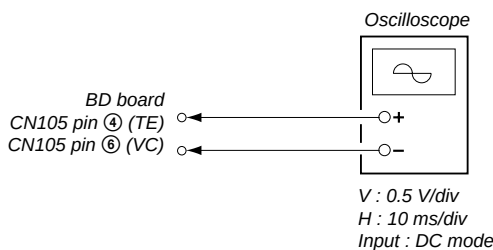
Note: Perform this function with the optical pick-up set at room temperature.

Procedure

1. Rotate the **AMS** knob to display "Iop NV Save" (C06).
2. Press the **YES** button and display "Iop [stop]".
3. After the display changes to "Iop =xxsave?", press the **YES** button.
4. After "Complete!" is displayed momentarily, the display changes to "Iop 7.0 mW".
5. After the display changes to "Iop=yysave?", press the **YES** button.
6. When "Complete!" is displayed, it means that Iop NV saving has been completed.

5-12. TRAVERSE ADJUSTMENT

Connection :

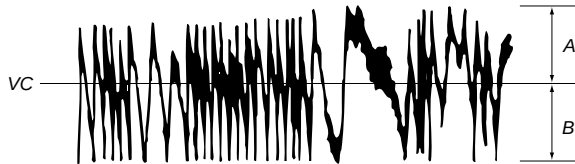


Adjusting Procedure :

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA1). (Refer to Note 1.)
3. Press the **▶▶** button and move the optical pick-up outside the pit.
4. Rotate the **AMS** knob and display "EF MO ADJUS" (C07).
5. Press the **YES** button and display "EFB = \$\$\$ MO-R".
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)

6. Rotate the **AMS** knob so that the waveform of the oscilloscope becomes the specified value.
(When the **AMS** knob is rotated, the \$\$\$ of "EFB= \$\$\$" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.
(Read power traverse adjustment)

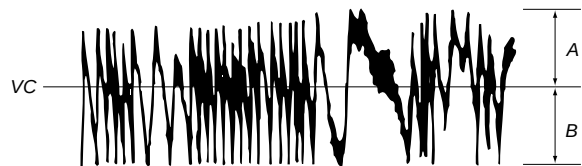
(Traverse Waveform)



Specification A = B

7. Press the **YES** button and save the result of adjustment to the non-volatile memory ("EFB = \$\$\$ SAVE" will be displayed for a moment. Then "EFB = \$\$\$ MO-W" will be displayed).
8. Rotate the **AMS** knob so that the waveform of the oscilloscope becomes the specified value.
(When the **AMS** knob is rotated, the \$\$\$ of "EFB= \$\$\$ MO-W" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.
(Write power traverse adjustment)

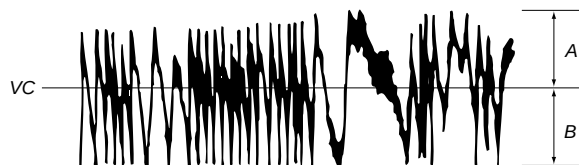
(Traverse Waveform)



Specification A = B

9. Press the **YES** button, and save the adjustment results in the non-volatile memory. ("EFB = \$\$\$ SAVE" will be displayed for a moment.)
10. "EFB = \$\$\$ MO-P". will be displayed.
The optical pick-up moves to the pit area automatically and servo is imposed.
11. Rotate the **AMS** knob until the waveform of the oscilloscope moves closer to the specified value.
In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

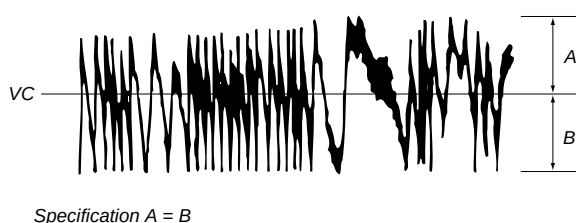
(Traverse Waveform)



Specification A = B

12. Press the **[YES]** button, and save the adjustment results in the non-volatile memory. ("EFB = **000** SAVE" will be displayed for a moment.)
Next "EF MO ADJUS" (C07) is displayed. The disc stops rotating automatically.
13. Press the **[EJECT]** button and remove the disc.
14. Load the check disc (MD) TDYS-1.
15. Rotate the **[<<AMS>>]** knob and display "EF CD ADJUS" (C08).
16. Press the **[YES]** button and display "EFB = **00** CD". Servo is imposed automatically.
17. Rotate the **[<<AMS>>]** knob so that the waveform of the oscilloscope moves closer to the specified value.
In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

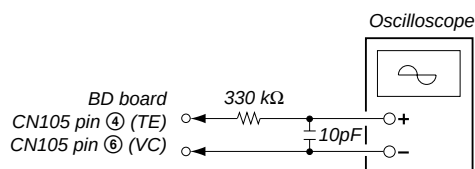
(Traverse Waveform)



18. Press the **[YES]** button, display "EFB = **00** SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EF CD ADJUS" (C08) will be displayed.
19. Press the **[EJECT]** button and remove the check disc (MD) TDYS-1.

Note 1 : MO reading data will be erased during if a recorded disc is used in this adjustment.

Note 2 : If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



5-13. FOCUS BIAS ADJUSTMENT

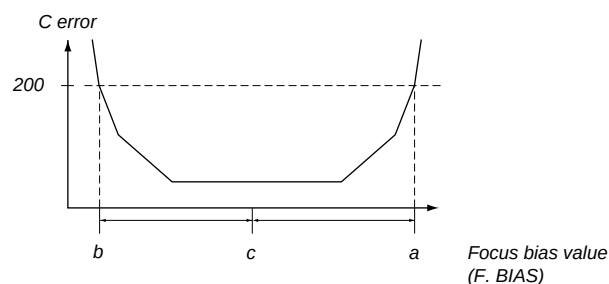
Adjusting Procedure :

1. Load a test disk (MDW-74/GA1).
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button and display "CPLAY1 MID".
4. The display change to "C = **0000** AD = **00**".
5. Press the **[MENU/NO]** button.
6. Rotate the **[<<AMS>>]** knob and display "FBIAS ADJUS" (C09).
7. Press the **[YES]** button and display "**0000/00** a = **00**".
The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
8. Rotate the **[<<AMS>>]** knob in the clockwise direction and find the focus bias value at which the C error rate becomes 200 (Refer to Note 2).
9. Press the **[YES]** button and display "**0000/00** b = **00**".
10. Rotate the **[<<AMS>>]** knob in the counterclockwise direction and find the focus bias value at which the C error rate becomes 200.

11. Press the **[YES]** button and display "**0000/00** c = **00**".
12. Check that the C error rate is below 50 and ADER is 2. Then press the **[YES]** button.
13. If the "(**00**)" in "**00** - **00** - **00** (**00**)" is above 20, press the **[YES]** button.
If below 20, press the **[MENU/NO]** button and repeat the adjustment from step 2.
14. Press the **[EJECT]** button to remove the test disc.

Note 1 : The relation between the C error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

Note 2 : As the C error rate changes, perform the adjustment using the average value.



5-14. ERROR RATE CHECK

5-14-1. CD Error Rate Check

Checking Procedure :

1. Load a check disc (MD) TDYS-1.
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button twice and display "CPLAY1 MID".
4. The display changes to "C = **0000** AD = **00**".
5. Check that the C error rate is below 50.
6. Press the **[MENU/NO]** button, stop playback, press the **[EJECT]** button, and remove the test disc.

5-14-2. MO Error Rate Check

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA1).
(Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button and display "CPLAY1 MID".
4. The display changes to "C = **0000** AD = **00**".
5. If the C error rate is below 50, check that ADER is 2.
6. Press the **[MENU/NO]** button, stop playback, press the **[EJECT]** button, and remove the test disc.

5-15. FOCUS BIAS CHECK

Change the focus bias and check the focus tolerance amount.

Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA1).
(Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the **◀AMS▶** knob and display "CPLAY 1MODE" (C34).
3. Press the **[YES]** button twice and display "CPLAY1 MID".
4. The display change to "C = 0000 AD = 00".
5. Press the **[MENU/NO]** button.
6. Rotate the **◀AMS▶** knob and display "FBIAS CHECK" (C16).
7. Press the **[YES]** button and display "0000/00 c = 00".
The first four digits indicate the C error rate, the two digits after [/] indicate ADR, and the 2 digits after [c =] indicate the focus bias value.
Check that the C error is below 50 and ADER is below 2.
8. Press the **[YES]** button and display "0000/00 b = 00".
Check that the C error is below 100 and ADER is below 2.
9. Press the **[YES]** button and display "0000/00 a = 00".
Check that the C error is below 100 and ADER is below 2.
10. Press the **[MENU/NO]** button, next press the **[EJECT]** button, and remove the continuously recorded disc.

Note 1 : If the C error and ADER are above other than the specified value at points a (step 9. in the above) or b (step 8. in the above), the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

5-16. AUTO GAIN CONTROL OUTPUT LEVEL ADJUSTMENT

Be sure to perform this adjustment when the Optical pick-up is replaced.

If the adjustment results becomes "Adjust NG!", the Optical pick-up may be faulty or the servo system circuits may be abnormal.

5-16-1. CD Auto Gain Control Output Level Adjustment

Adjusting Procedure :

1. Insert the check disc (MD) TDYS-1.
2. Rotate the **◀AMS▶** knob to display "AG Set (CD)" (C11).
3. When the **[YES]** button is pressed, the adjustment will be performed automatically.
"Complete!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (CD)" (C11).
4. Press the **[EJECT]** button to remove the disc.

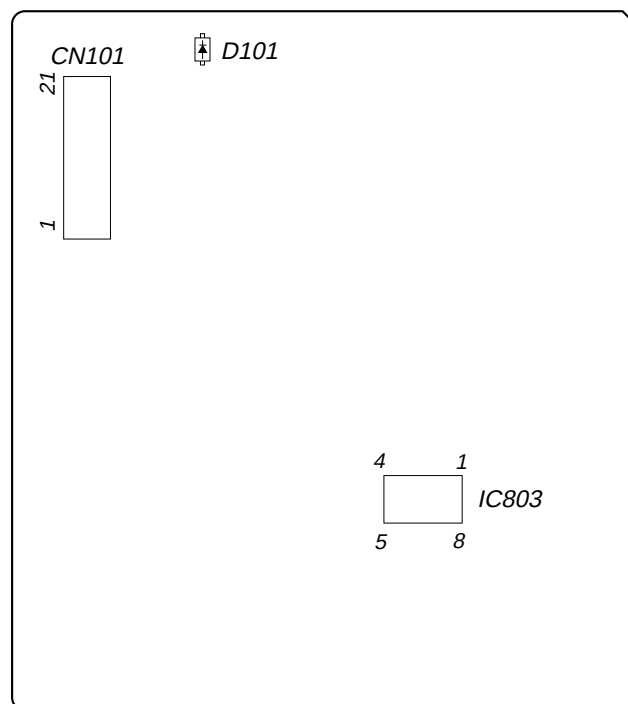
5-16-2. MO Auto Gain Control Output Level Adjustment

Adjusting Procedure :

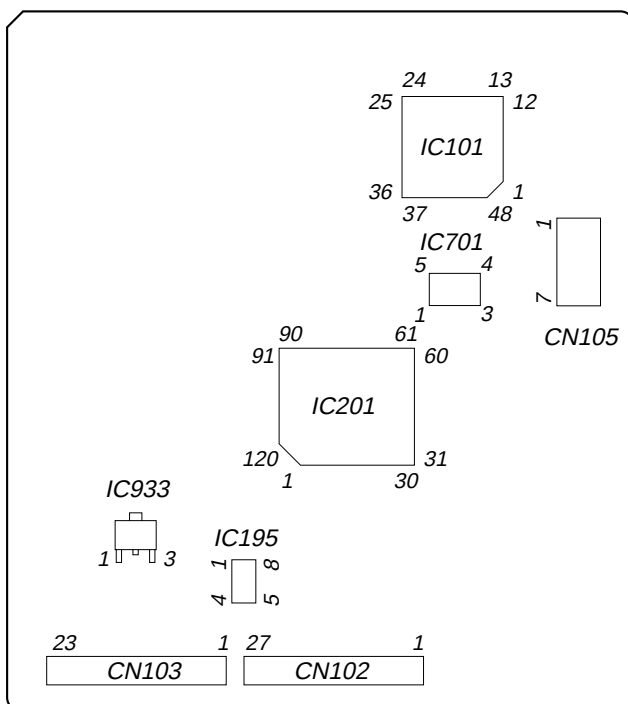
1. Insert the reference disc (MDW-74/GA-1) for recording.
2. Rotate the **◀AMS▶** knob to display "AG Set (MO)" (C10).
3. When the **[YES]** button is pressed, the adjustment will be performed automatically.
"Complete!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (MO)" (C10).
4. Press the **[EJECT]** button to remove the disc.

5-17. ADJUSTING POINTS AND CONNECTING POINTS

[BD BOARD] (SIDE A)



[BD BOARD] (SIDE B)



NOTE: It is useful to use the jig. for checking the waveform. (Refer to Servicing Note on page 6.)

SECTION 6
DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING
BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed
in each block.)

For schematic diagrams.

Note:

- All capacitors are in μF unless otherwise noted. pF : μF
- 50 W or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and $\frac{1}{4}\text{W}$ or less unless otherwise specified.
- Δ : internal component.
- $\square$: panel designation.

Note:

The components identified by mark Δ or dotted line with mark Δ are critical for safety.
Replace only with part number specified.

- --- : B+ Line.
- --- : B- Line.
- $\square$: adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- no mark : STOP
- () : PLAY
- < > : REC
- * : Impossible to measure
- Voltages are taken with a VOM (Input impedance 10 M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
 - --- : PB
 - --- : REC
 - --- : REC (DIGITAL IN)
 - --- : PLAY (DIGITAL OUT)
- Abbreviation
SP : Singapore model

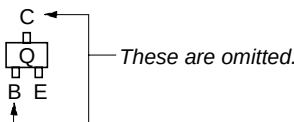
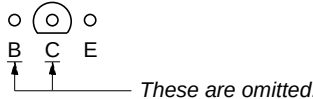
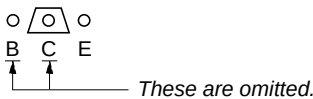
For printed wiring boards.

Note:

- --- : parts extracted from the component side.
- --- : parts extracted from the conductor side.
- $\circ$: Through hole.
- --- : Pattern from the side which enables seeing. (The other layers' patterns are not indicated.)

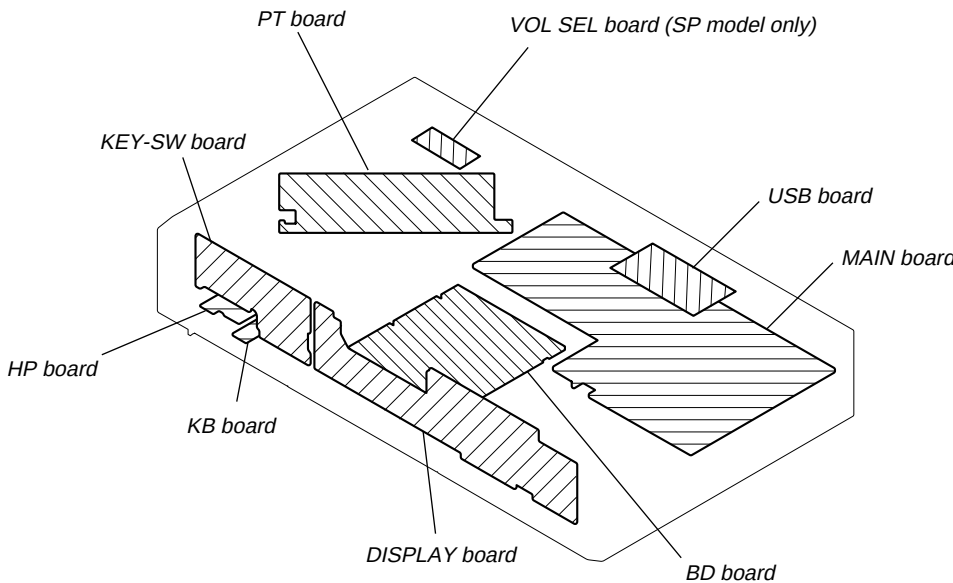
Caution:

Pattern face side: Parts on the pattern face side seen from the (Side B) pattern face are indicated.
Parts face side: Parts on the parts face side seen from the (Side A) parts face are indicated.



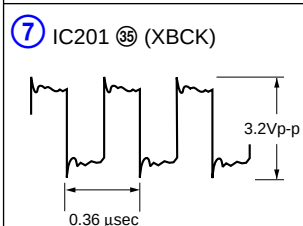
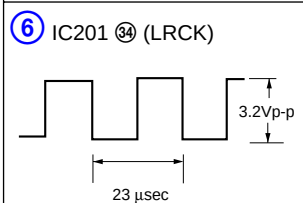
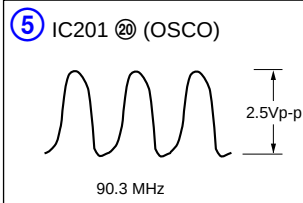
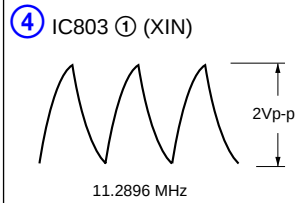
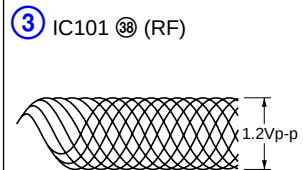
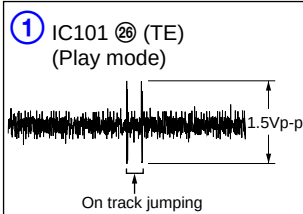
- Abbreviation
SP : Singapore model

6-1. CIRCUIT BOARDS LOCATION

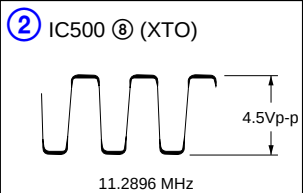
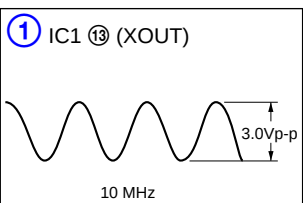


• WAVEFORMS

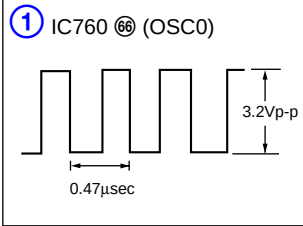
– BD Board –



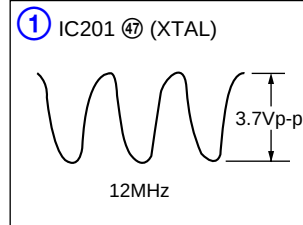
– MAIN Board –



– DISPLAY Board –

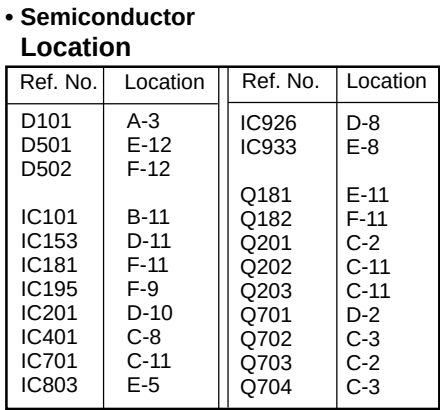


– USB Board –

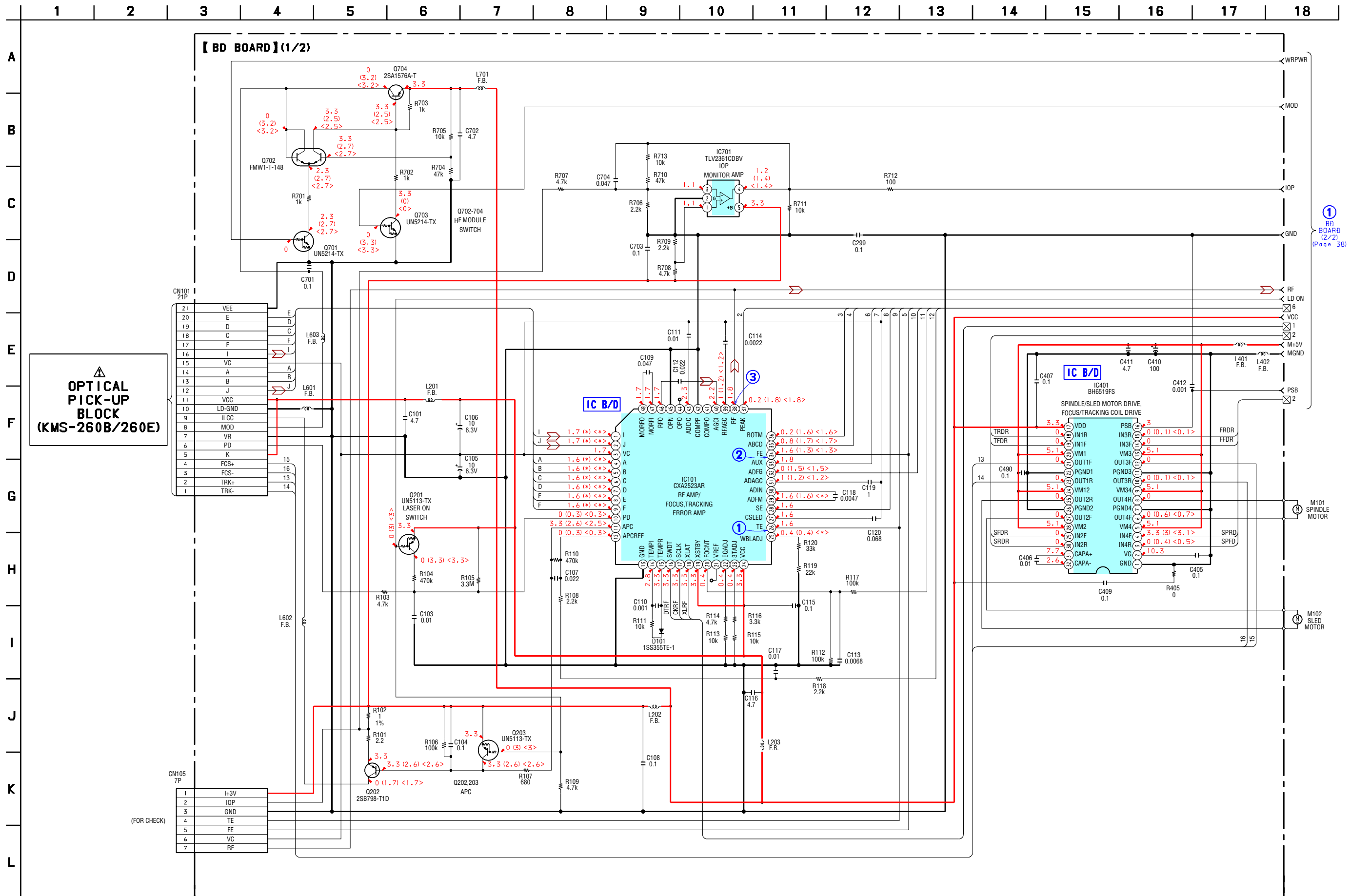








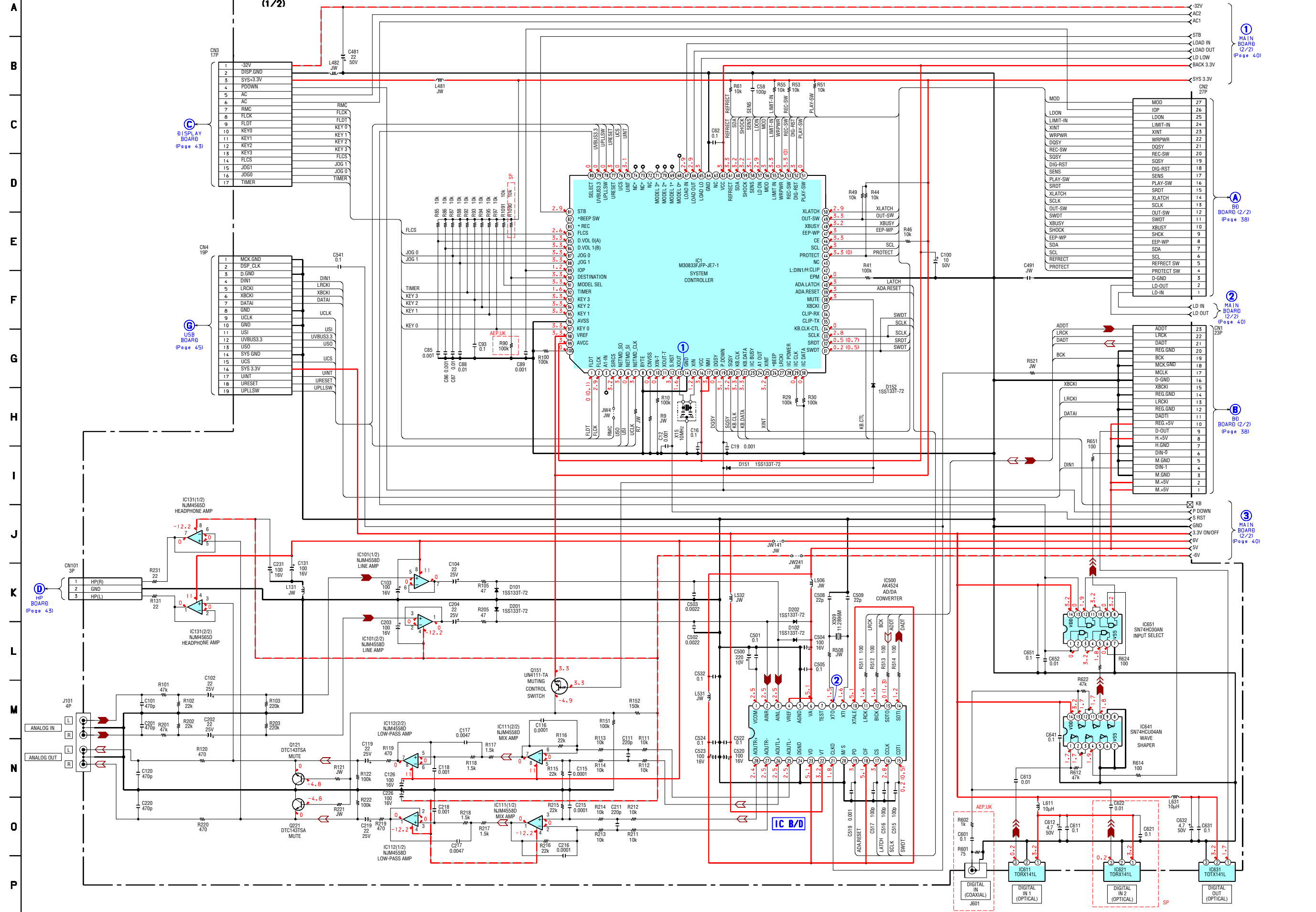
6-4. SCHEMATIC DIAGRAM – BD SECTION (1/2) – • See page 46 for IC Pin Functions.



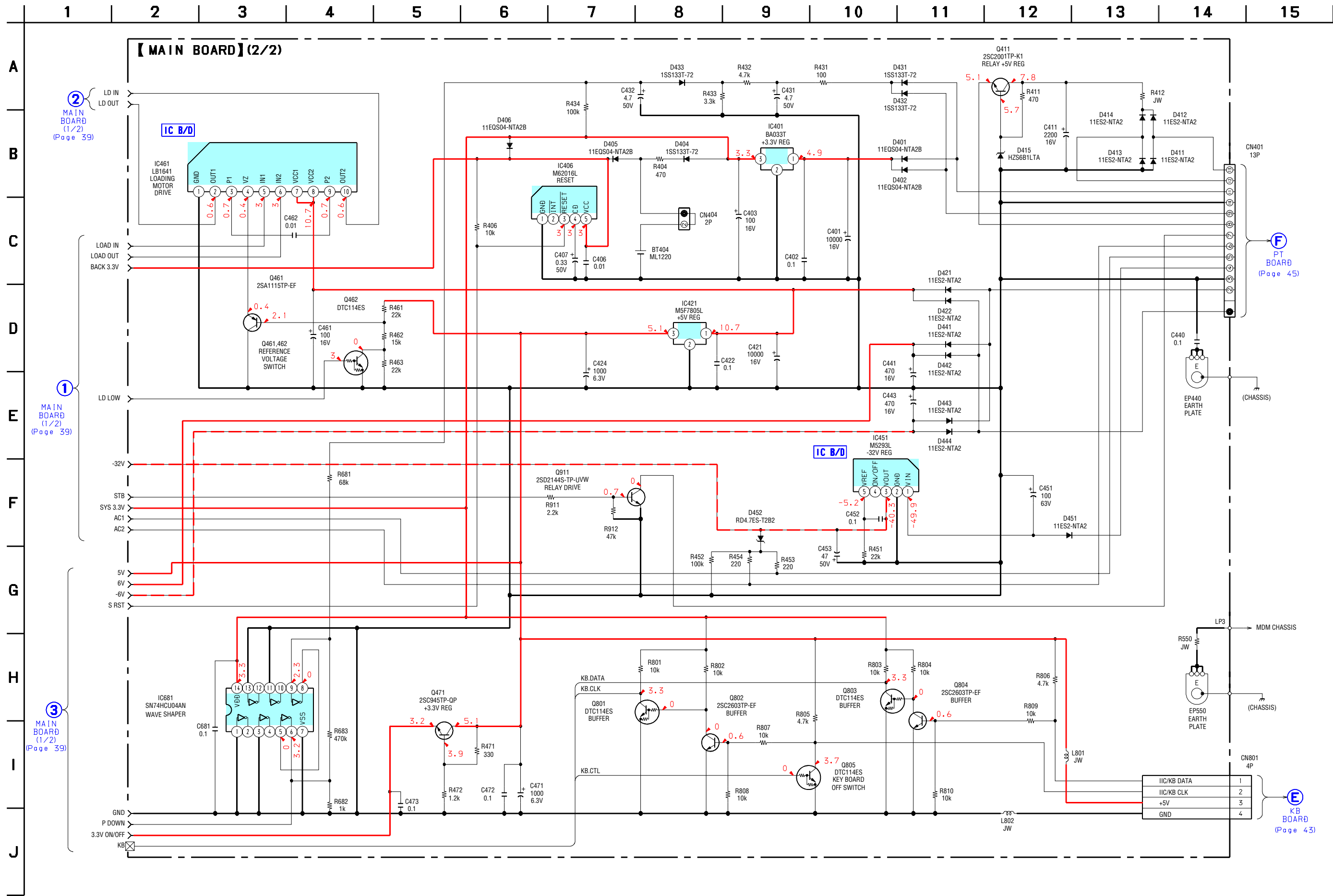


A (1/2)

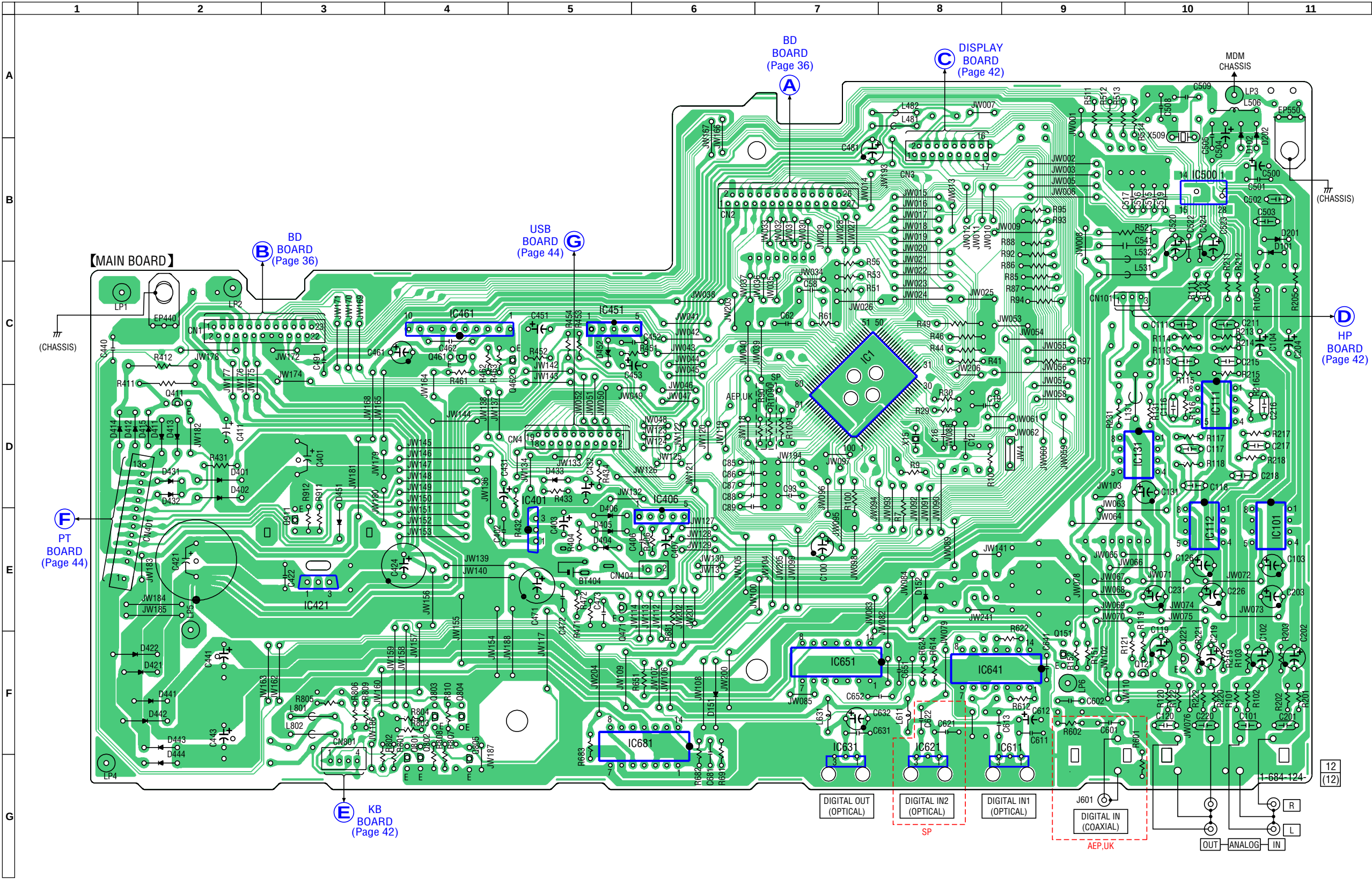
The diagram shows a horizontal red dashed line. A black dot is located on this line. A vertical line segment extends downwards from the dot to a horizontal black line. To the right of this, there is another horizontal black line, shorter than the first one, which is also connected to the red dashed line by a vertical segment.



6-7. SCHEMATIC DIAGRAM – MAIN SECTION (2/2) –



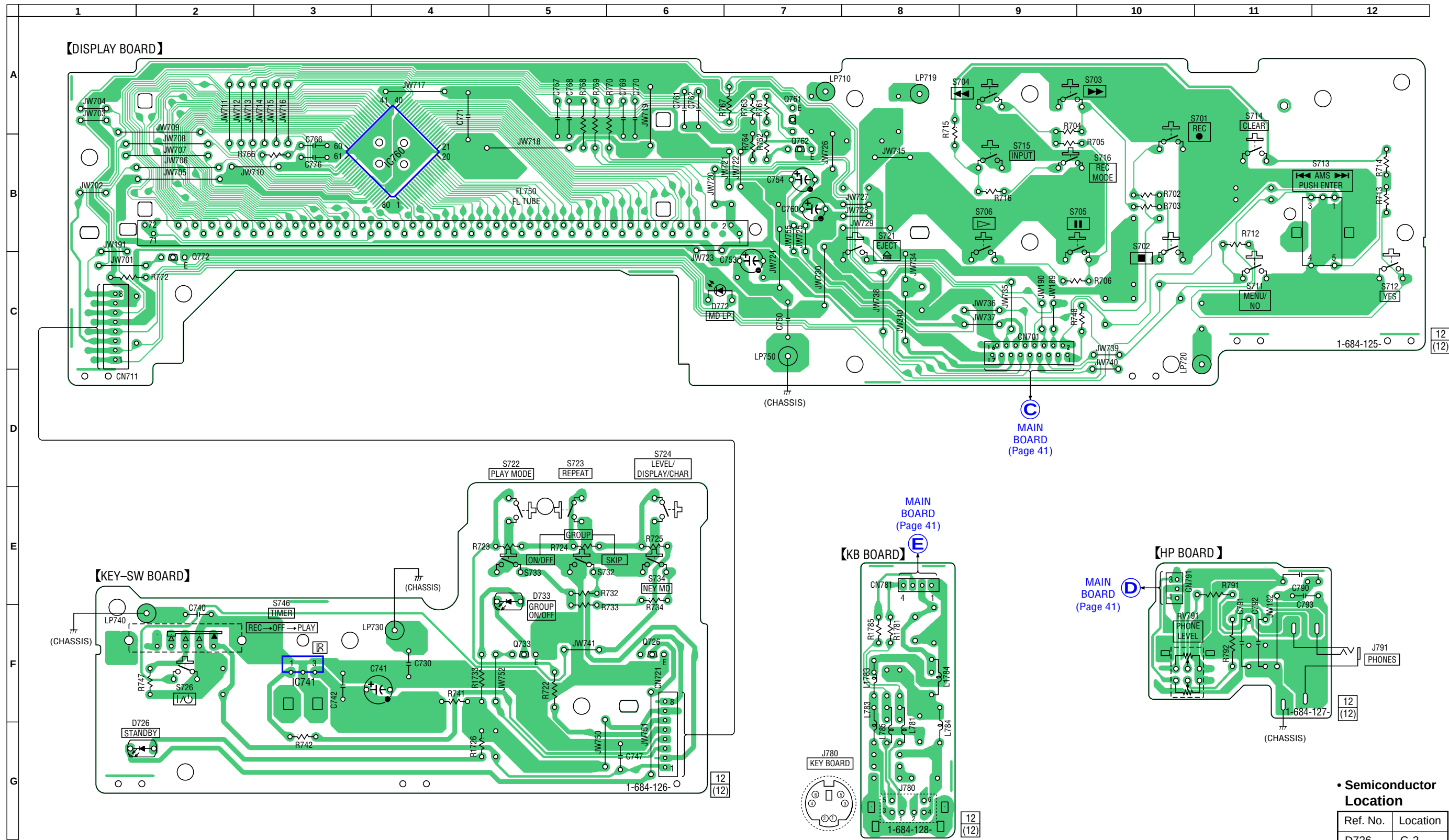
6-8. PRINTED WIRING BOARD – MAIN SECTION – • See page 33 for Circuit Board Location.



• Semiconductor Location

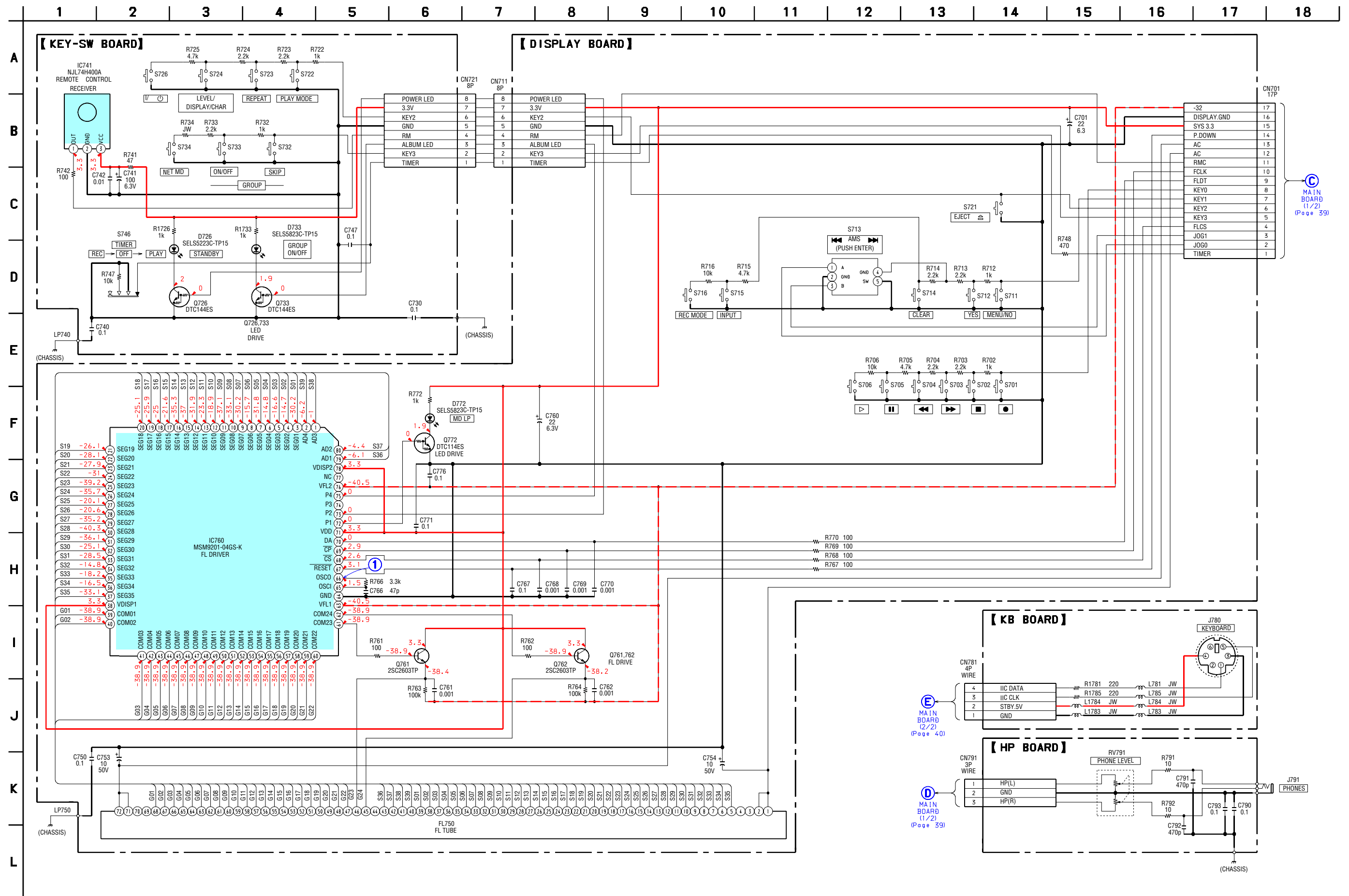
Ref. No.	Location
D101	B-11
D102	A-10
D151	F-6
D152	E-8
D201	B-11
D202	A-11
D401	D-2
D402	D-2
D404	E-5
D405	E-5
D406	E-5
D411	D-2
D412	D-1
D413	D-2
D414	D-1
D415	D-2
D421	F-2
D422	F-2
D431	D-2
D432	D-2
D433	D-5
D441	F-2
D442	F-2
D443	F-2
D444	G-2
D451	E-3
D452	C-5
IC1	C-7
IC101	E-11
IC111	D-10
IC112	E-10
IC131	D-10
IC401	E-5
IC406	E-6
IC421	E-3
IC451	C-5
IC461	C-4
IC500	B-10
IC611	F-9
IC621	F-8
IC631	F-7
IC641	F-8
IC651	F-7
IC681	F-6
Q121	F-10
Q151	F-9
Q221	F-10
Q411	D-2
Q461	C-4
Q462	C-5
Q471	E-5
Q801	F-4
Q802	F-4
Q803	F-4
Q804	F-4
Q805	F-4
Q911	E-3

6-9. PRINTED WIRING BOARD – DISPLAY SECTION – • See page 33 for Circuit Board Location.

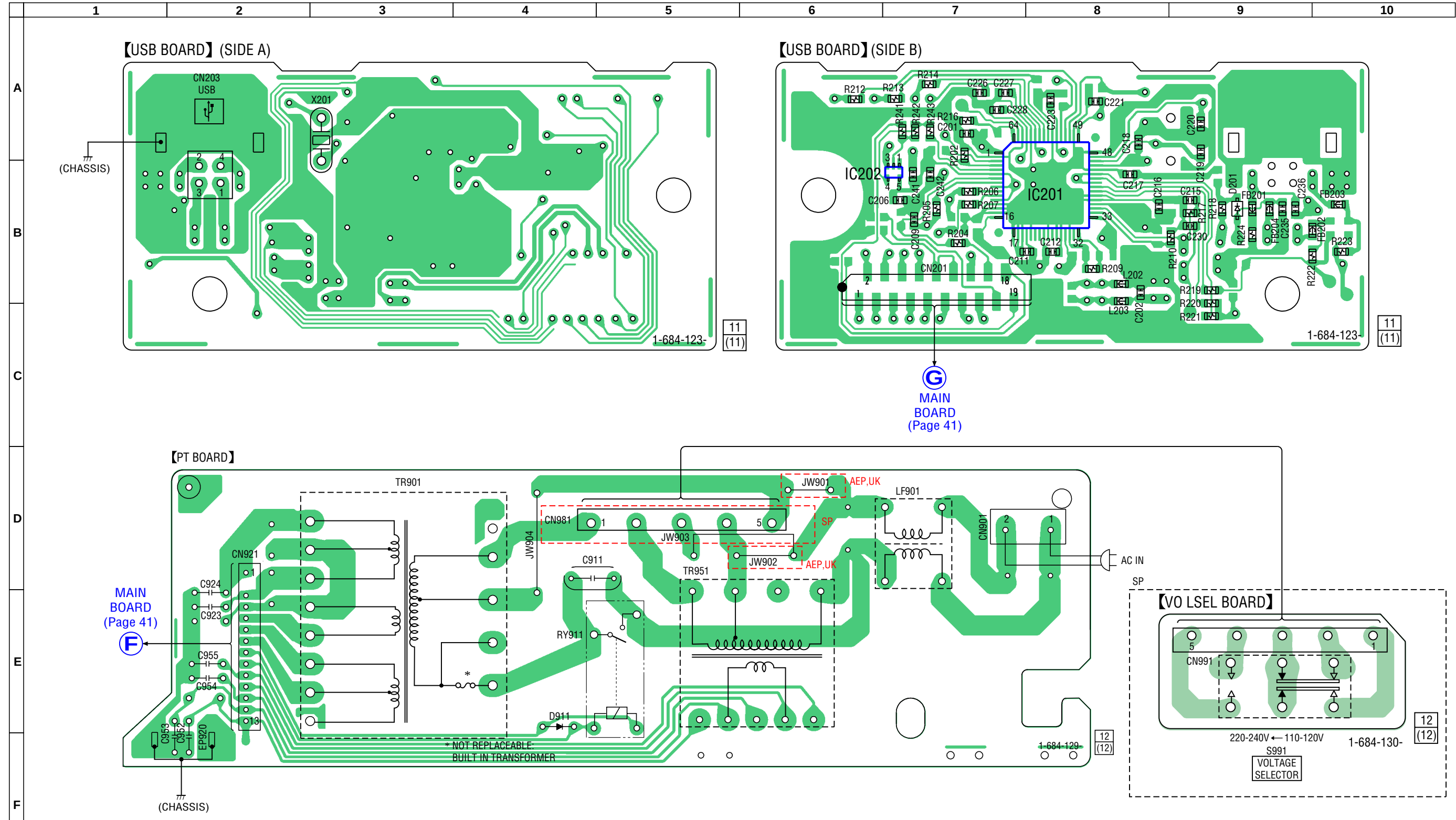


• Semiconductor Location	
Ref. No.	Location
D726	G-2
D733	E-5
D772	C-6
IC741	F-3
IC760	B-4
Q726	F-6
Q733	F-5
Q761	A-7
Q762	B-7
Q772	C-2

6-10. SCHEMATIC DIAGRAM – DISPLAY SECTION –



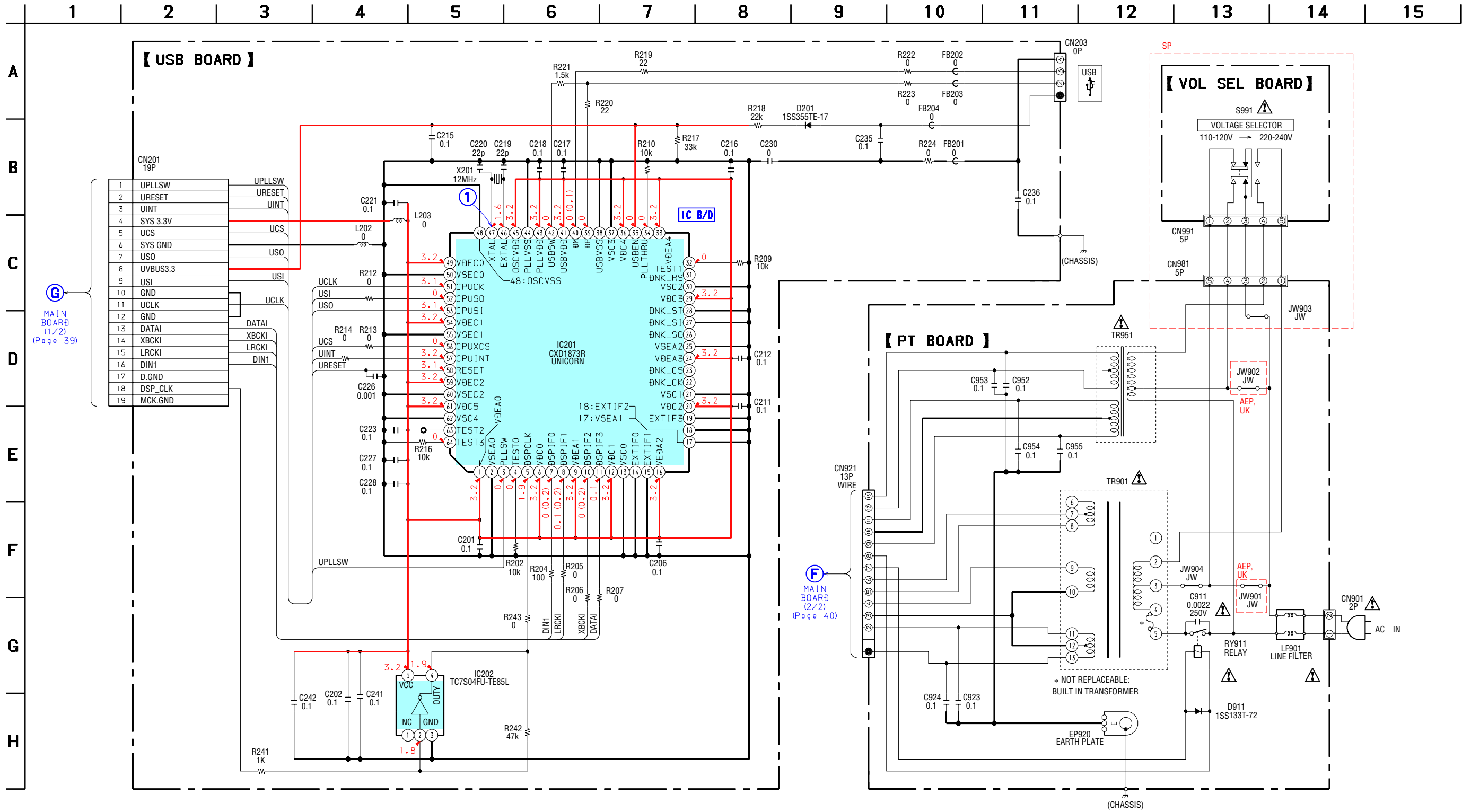
6-11. PRINTED WIRING BOARD – USB/POWER SECTION – • See page 33 for Circuit Board Location.



• Semiconductor Location

Ref. No.	Location
D201	B-9
D911	E-4
IC201	B-8
IC202	B-7

6-12. SCHEMATIC DIAGRAM – USB/POWER SECTION –



6-13. IC PIN FUNCTION DESCRIPTION

• IC101 CXA2523AR RF Amplifier (BD BOARD)

Pin No.	Pin Name	I/O	Description
1	I	I	I-V converted RF signal I input
2	J	I	I-V converted RF signal J input
3	VC	O	Middle point voltage generation output
4 - 9	A to F	I	Signal input from the optical pick-up detector
10	PD	I	Light amount monitor input
11	APC	O	Laser APC output
12	APCREF	I	Reference voltage input for setting laser power
13	GND	—	Ground
14	TEMPI	I	Temperature sensor connection
15	TEMPR	O	Reference voltage output for the temperature sensor
16	SWDT	I	Serial data input from the CXD2664R
17	SCLK	I	Serial clock input from the CXD2664R
18	XLAT	I	Latch signal input from the CXD2664R “L”: Latch
19	XSTBY	I	Stand by signal input (Fixed at “H”)
20	F0CNT	I	Center frequency control voltage input of BPF22, BPF3T, EQ from the CXD2664R
21	VREF	O	Reference voltage output (Not used)
22	EQADJ	I	Center frequency setting pin for the internal circuit EQ
23	3TADJ	I	Center frequency setting pin for the internal circuit BPF3T
24	Vcc	—	Power supply
25	WBLADJ	I	Center frequency setting pin for the internal circuit BPF22
26	TE	O	Tracking error signal output to the CXD2664R
27	CSLED	—	External capacitor connection pin for the sled error signal LPF
28	SE	O	Sled error signal output to the CXD2664R
29	ADFM	O	FM signal output of ADIP
30	ADIN	I	ADIP signal comparator input ADFM is connected with AC coupling
31	ADAGC	—	External capacitor connection pin for AGC of ADIP
32	ADFG	O	ADIP duplex signal output to the CXD2664R
33	AUX	O	I3 signal/temperature signal output to the CXD2664R
34	FE	O	Focus error signal output to the CXD2664R
35	ABCD	O	Light amount signal output to the CXD2664R
36	BOTM	O	RF/ABCD bottom hold signal output to the CXD2664R
37	PEAK	O	RF/ABCD peak hold signal output to the CXD2664R
38	RF	O	RF equalizer output to the CXD2664R
39	RFAGC	—	External capacitor connection pin for the RF AGC circuit
40	AGCI	I	The RF amplifier output is input with AC coupling
41	COMPO	O	User comparator output (Not used)
42	COMPP	I	User comparator input (Fixed at “L”)
43	ADDC	—	External capacitor pin for cutting the low band of the ADIP amplifier
44	OPO	O	User operation amplifier output (Not used)
45	OPN	I	User operation amplifier inversion input (Fixed at “L”)
46	RFO	O	RF amplifier output
47	MORFI	I	Groove RF signal is input with AC coupling
48	MORFO	O	Groove RF signal output

- Abbreviation
APC: Auto Power Control
AGC: Auto Gain Control

• IC201 CXD2664R Digital Signal Processor, Digital Servo Signal Processor (BD BOARD)

Pin No.	Pin Name	I/O	Description
1	MNT0 (FOK)	O	Not used (open)
2	MNT1 (SHCK)	O	Track jump detection signal output to the system control
3	MNT2 (XBUSY)	O	In the state of executire command signal output
4	MNT3 (SLOC)	O	Not used (open)
5	VDC0	—	Power supply
6	SWDT	I	Serial data input from the system control
7	SCLK	I	Serial clock signal input from the system control
8	XLAT	I	Serial latch signal input from the system control
9	VSC0	—	Ground
10	SRDT	O (3)	Serial reading data output to the system control
11	SENS	O (3)	Internal status (SENSE) output to the system control
12	XRST	I	Reset signal input from the system control “L”: Reset
13	SQSY	O	Subcode Q sync (SCOR) output to the system control
14	DQSY	O	Digital In U-bit CD format or MD format subcode Q sync (SCOR) output to the system control
15	RPWR	I	Laser power switching input from the system control “H”: Recording, “L”: Playback
16	XINT	O	Interrupt status output to the system control
17	TX	O	Recording data output enable input from the system control
18	VDIO0	—	Power supply
19	OSCI	I	System clock input (Fixed at “L”)
20	OSCO	I/O	System clock input (Input terminal during OSCN:“H”)
21	OSCN	I	Internal oscillating circuit control signal input
22	VSIO0	—	Ground
23	XTSL	I	System clock frequency setting (Fixed at “H”)
24	DIN0	I	Digital audio input (Optical input)
25	DIN1	I	Digital audio input (USB input)
26	DOUT	O	Digital audio output (Optical output)
27	DADTI	I	Serial data input
28	LRCKI	I	LR clock input
29	XBCKI	I	Serial data bit clock input
30	VDC1	—	Power supply
31	VSC1	—	Ground
32	ADDT	I	Data input from the A/D converter
33	DADT	O	Data output to the D/A converter
34	LRCK	O	LR clock output for the A/D and D/A converter
35	XBCK	O	Bit clock output to the A/D and D/A converter
36	FS256	O	256Fs clock output (Not used)
37	XWE	O	Write enable signal output for DRAM
38	XOE	O	Read enable output for DRAM
39	DRVDD0	—	Power supply
40	DRVSS0	—	Ground
41	A11	O	DRAM address output (Not used) (Open)
42	D3	I/O	Data input/output for DRAM
43	D0	I/O	
44	D2	I/O	
45	D1	I/O	

* O (3) for 3-state output in the column I/O

Pin No.	Pin Name	I/O	Description
46	XCAS	O	CAS signal output for DRAM
47	XRAS	O	RAS signal output for DRAM
48	A09	O	DRAM address output
49	A08	O	
50	A10	O	Not used (Open)
51	A07	O	DRAM address output
52	A00	O	
53	A06	O	
54	A01	O	
55	A05	O	
56	A02	O	
57	VDC2	—	Power supply
58	VSC2	—	Ground
59	A04	O	DRAM address output
60	A03	O	DRAM address output
61	DRVDD1	—	Power supply
62	DRVSS1	—	Ground
63	TEST0	I	Not used (Fixed at “L”)
64	TEST1	I	Not used (Fixed at “H”)
65	TEST2	I	Not used (Open)
66	AVD1	—	Power supply
67	ASYO	O	Play back EFM duplex signal output
68	ASYI	I (A)	Play back EFM comparator slice level input
69	BIAS	I (A)	Play back EFM comparator bias current input
70	RFI	I (A)	Play back EFM RF signal input
71	AVS1	—	Ground
72	PCO	O (3)	Phase comparison output for the recording/playback EFM master PLL
73	FILI	I (A)	Filter input for the recording/playback EFM master PLL
74	FILO	O (A)	Filter output for the recording/playback EFM master PLL
75	CLTV	I (A)	Internal VCO control voltage input for the recording/playback EFM master PLL
76	PEAK	I (A)	Light amount signal peak hold input
77	BOTM	I (A)	Light amount signal bottom hold input
78	ABCD	I (A)	Light amount signal input
79	FE	I (A)	Focus error signal input from the CXA2523AR
80	AUX1	I (A)	Auxiliary A/D input
81	VC	I (A)	Middle point voltage input from the CXA2523AR
82	ADIO	O (A)	Monitor output of the A/D converter input signal (Not used) (Open)
83	ADRT	I (A)	A/D converter operational range upper limit voltage input (Fixed at “H”)
84	ADRB	I (A)	A/D converter operational range lower limit voltage input (Fixed at “L”)
85	SE	I (A)	Sled error signal input from the CXA2523AR
86	TE	I (A)	Tracking error signal input from the CXA2523AR
87	AVD2	—	Power supply
88	AVS2	—	Ground
89	DCHG	I (A)	Connected to +3V power supply
90	APC	I	APC error signal input (Not used) (Fixed at “H”)
91	ADFG	I	ADIP duplex FM signal input from the CXA2523AR

* I (A) for analog input, O (3) for 3-state output, and O (A) for analog output in the column I/O

• Abbreviation

EFM: Eight to Fourteen Modulation

PLL : Phase Locked Loop

VCO: Voltage Controlled Oscillator

Pin No.	Pin Name	I/O	Description
92	VDIO1	—	Power supply
93	VSIO1	—	Ground
94	F0CNT	O	Filter f0 control output to the CXA2523AR
95	VDC3	—	Power supply
96	VSC3	—	Ground
97	XLRF	O	Control latch output to the CXA2523AR
98	CLRF	O	Control clock output to the CXA2523AR
99	DTRF	O	Control data output to the CXA2523AR
100	APCR	O	Reference PWM output for the laser APC
101	LDDR	O	PWM output for the laser digital APC (Not used) (Open)
102	TRDR	O	Tracking servo drive PWM output (–)
103	TFDR	O	Tracking servo drive PWM output (+)
104	FFDR	O	Focus servo drive PWM output (+)
105	FRDR	O	Focus servo drive PWM output (–)
106	FS4	O	4Fs clock signal output (Not used) (Open)
107	SRDR	O	Sled servo drive PWM output (–)
108	SFDR	O	Sled servo drive PWM output (+)
109	SPRD	O	Spindle servo drive PWM output (–)
110	SPFD	O	Spindle servo drive PWM output (+)
111	FGIN	I	Spindle CAV servo FG signal input (Fixed at “L”)
112-114	TST1 to TST3	I	Test input (Fixed at “L”)
115	EFMO	O	EFM output when recording
116	VDIO2	—	Power supply
117	VSIO2	—	Ground
118	VDC4	—	Power supply
119	VSC4	—	Ground
120	MDDT1	I	MD data mode1 switching signal input (Fixed at “L”)

- Abbreviation
EFM: Eight to Fourteen Modulation

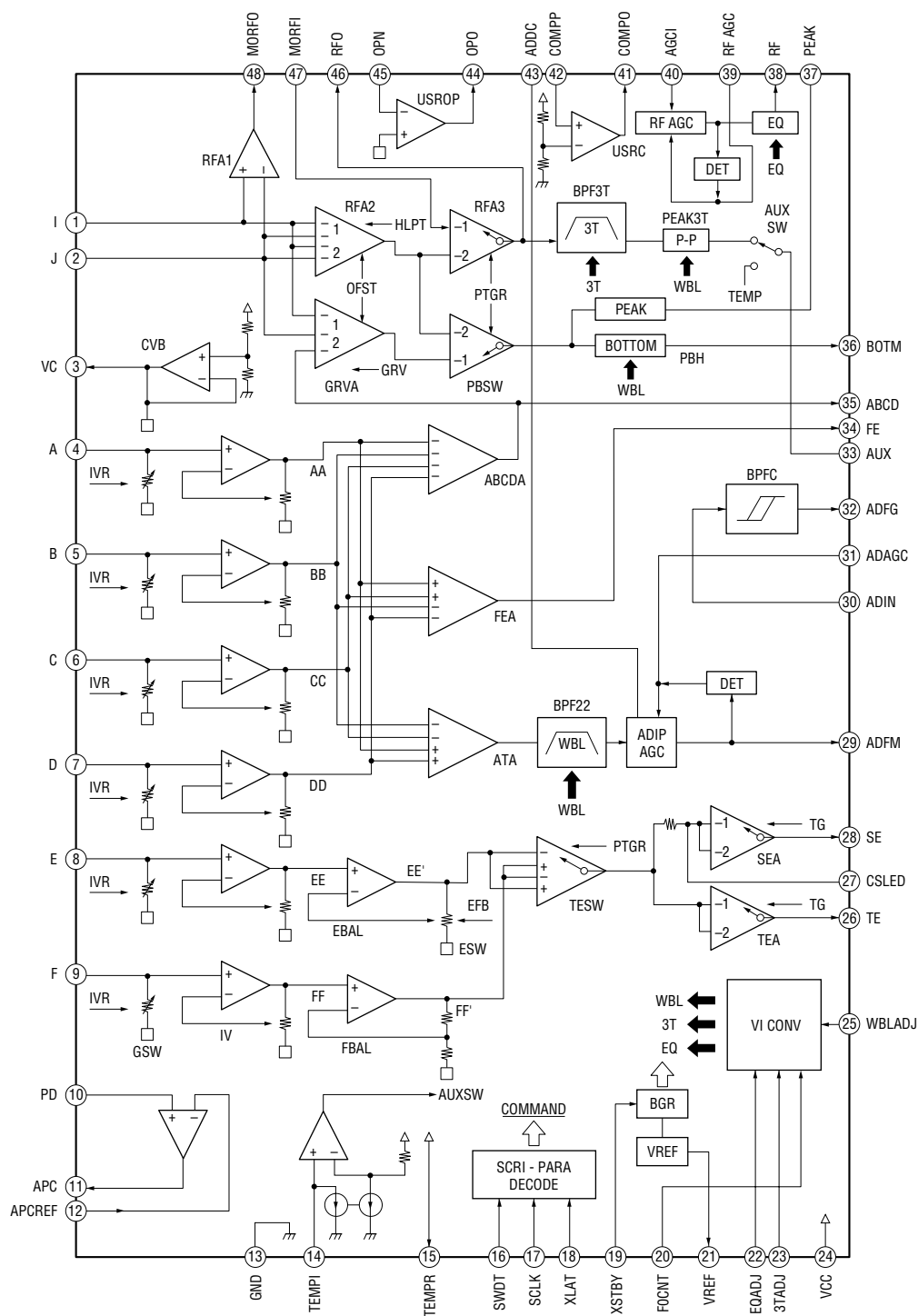
• IC1 M30833FJFP-JE7-1 SYSTEM CONTROL (MAIN BOARD)

Pin No.	Pin Name	I/O	Description
1	FLDT	O	Serial data output to the display driver
2	FLCK	O	Serial clock signal output to the display driver. L: Active
3	A1-IN	I	A1 Control input (Not used) (Open)
4	SIRCS	I	Remote control input
5	NETMD_SO	O	Serial data output to UNICORN NETMD-USB I/F
6	NETMD_SI	I	Serial data input from UNICORN NETMD-USB I/F
7	NETMD_CLK	O	Clock signal output to UNICORN NETMD-USB I/F
8	BYTE	I	Data bus changed input (Fixed at “L”)
9	CNVSS	—	Ground
10	XIN-T	I	Not used (Fixed at “L”)
11	XOUT-T	O	Not used (Open)
12	S.RST	I	System reset input
13	XOUT	O	Main clock output (10MHz)
14	GND	—	Ground
15	XIN	I	Main clock input (10MHz)
16	VCC	—	Power supply
17	NMI	I	Fixed at H (Fixed at “H”)
18	DQSY	I	Digital in sync input (Record system)
19	P.DOWN	I	Power down detection input L: Power down
20	SQSY	I	ADIP (MO) sync or subcode Q (PIT) sync input from CXD2664R (Playback system)
21	KB.CLK	I	Keyboard clock input
22	KB.DATA	I	Keyboard data input
23	IIC BUSY	I	IIC cable connect check (Not used) (Open)
24	A1 OUT	O	A1 control output (Not used) (Open)
25	XINIT	I	Interrupt status input from CXD2664R
26	*BEEP	O	Not used (Open)
27	LRCKI	O	Not used (Open)
28	IIC POWER	O	Not used (Open)
29	IIC CLK	O	Not used (Fixed at “L”)
30	IIC DATA	I/O	Not used (Fixed at “L”)
31	SWDT	O	Writing data signal output to the serial bus
32	SRDT	I	Reading data signal input from the serial bus
33	SCLK	O	Clock signal output to the serial bus
34	KB.CLK-CTRL	O	Keyboard clock ON/OFF signal output
35	CLIP-TX	O	Not used (Open)
36	CLIP-RX	I	Not used (Open)
37	XBCK1	O	Not used (Open)
38	MUTE	O	Line out muting output
39	ADA.RESET	O	Reset signal output to the AK4524
40	ADA. LATCH	O	Latch signal output to the AK4524
41	EPN	I	Not used (Fixed at “L”)
42	L : DINT1/H : CLIP	O	Not used (Open)
43	NC	O	Not used (Open)
44	PROTECT	I	Recording-protection claw detection input from the protection detection switch H: Protect
45	SCL	O	Clock signal output to the EEPROM
46	CE	I	Not used (Pull-up)

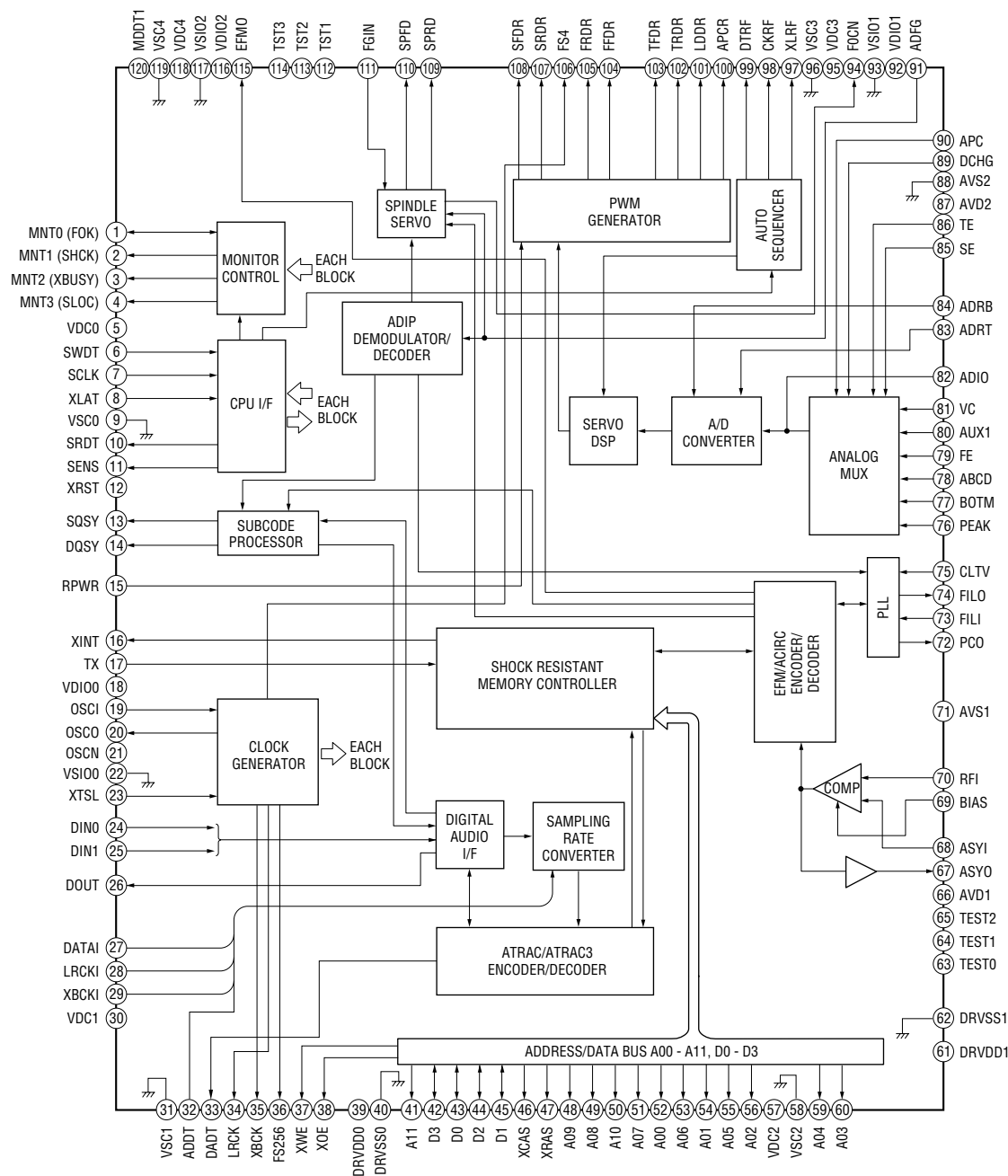
Pin No.	Pin Name	I/O	Description
47	EEP-WP	O	EEP-ROM write protect signal output L: write possibility
48	XBUSY	I	In the state of executive command from the CXD2664R
49	OUT-SW	I	Detection signal input from the loading out detection switch
50	XLATCH	O	Latch signal output to the serial bus
51	PLAY-SW	I	Detection signal input from the playback position detection switch L: PLAY
52	DIG-RST	O	Digital rest signal output to the CXD2664R and motor driver
53	REC-SW	I	Detection signal input from the recording position detection switch L: REC
54	WR PWR	O	Laser power ON/OFF output
55	LIMIT-IN	I	Detection input from the limit switch L: Sled limit-In H: Sled limit-Out
56	MOD	O	Laser modulation switching signal output
57	LDON	O	Laser ON/OFF control output
58	SENS	I	Internal status (SENSE) input from the CXD2664R
59	SHCK	I	Track jump signal input from the CXD2664R
60	SDA	I/O	Serial data input/output pin with the EEPROM
61	REFLECT	I	Disk reflection rate detection input from the reflect detection switch. H: Disk with low reflection rate
62	VCC	—	Power supply
63	NC	O	Not used (Open)
64	GND	—	Ground
65	LOAD LO	O	Loading motor voltage control output
66	LOAD OUT	O	Loading motor control output H: eject
67	LOAD IN	O	Loading motor control output H: loading
68 to 71	MODEL SEL 0 to 3	O	Not used (Open)
72 to 74	NC	O	Not used (Open)
75	UNIT	I	Interrupt signal input from UNICORN NETMD-USB I/F
76	UCS	O	Chip select signal output to UNICORN NETMD-USB I/F
77	URESET	O	Reset signal output to UNICORN NETMD-USB I/F
78	UPLLSW	O	PLL ON/OFF signal output to UNICORN NETMD-USB I/F
79	UVBUS3.3	I	V bus voltage input from UNICORN NETMD-USB I/F
80	SELECT	O	UNICORN optical input select signal output
81	STB	O	Strobe signal output to the power supply circuit H: Power supply ON: L: standby
82	BEEP SW	O	Not used (Open)
83	REC	O	Not used (Open)
84	FLCS	O	Chip select signal output to the MSM9202
85, 86	D.VOL0,1	O	Not used
87, 88	JOG0, JOG1	I	Jog dial pulse input from the rotary encoder
89	IOP	I	Optical Pick-up voltage (current) detect signal input
90	DISTINATION	I	Model discrimination
91	MODEL SEL	I	Model discrimination
92	TIMER	I	Timer select signal input from timer select switch
93 to 95	KEY3 to 1	I	Key input pin (A/D input)
96	AVSS	—	Ground
97	KEY0	I	Key input pin (A/D input)
98	VREF	I	A/D reference voltage (Fixed at “H”)
99	AVCC	—	Power supply
100	NC	I	Not used (Fixed at “L”)

6-14. IC BLOCK DIAGRAMS

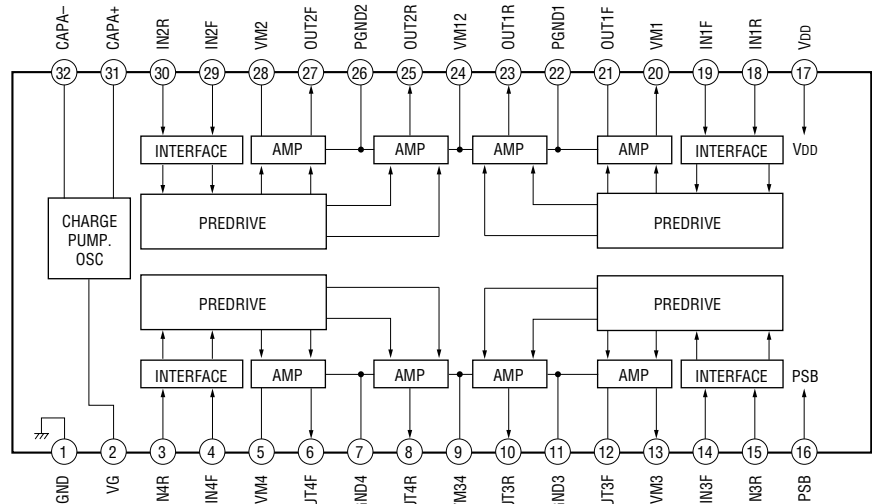
IC101 CXA2523AR (BD BOARD)



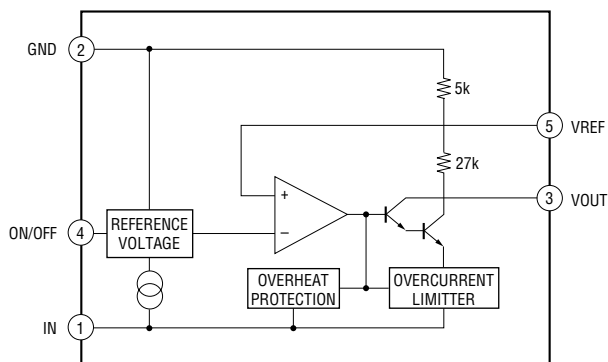
IC201 CXD2664R (BD BOARD)



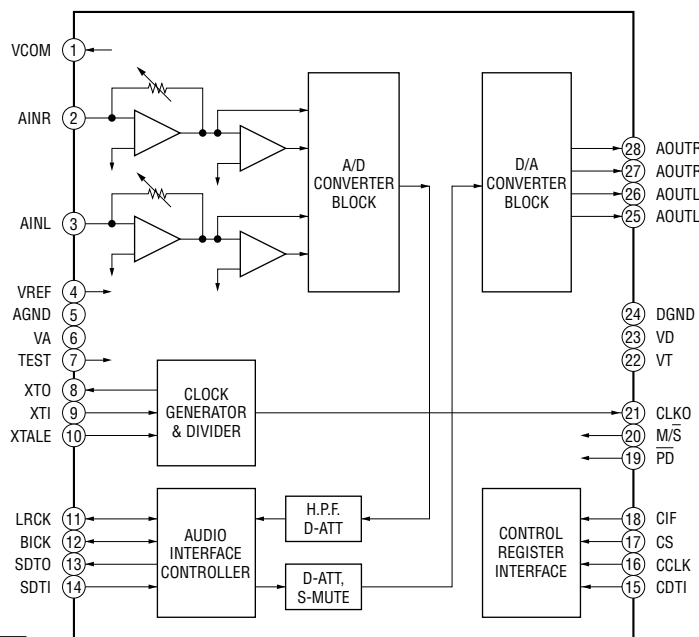
IC401 BH6519FS-E2 (BD BOARD)



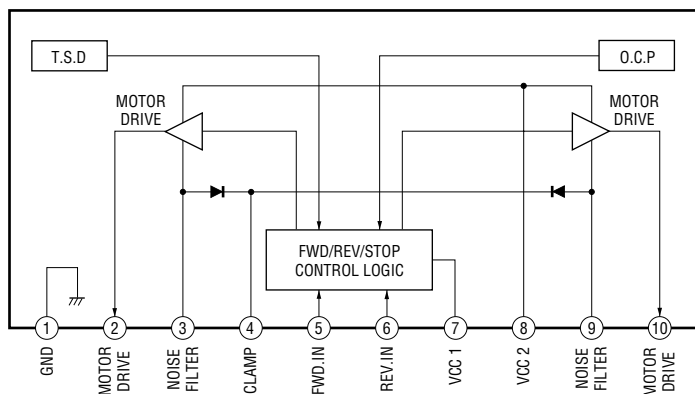
IC451 M5293L (MAIN BOARD)



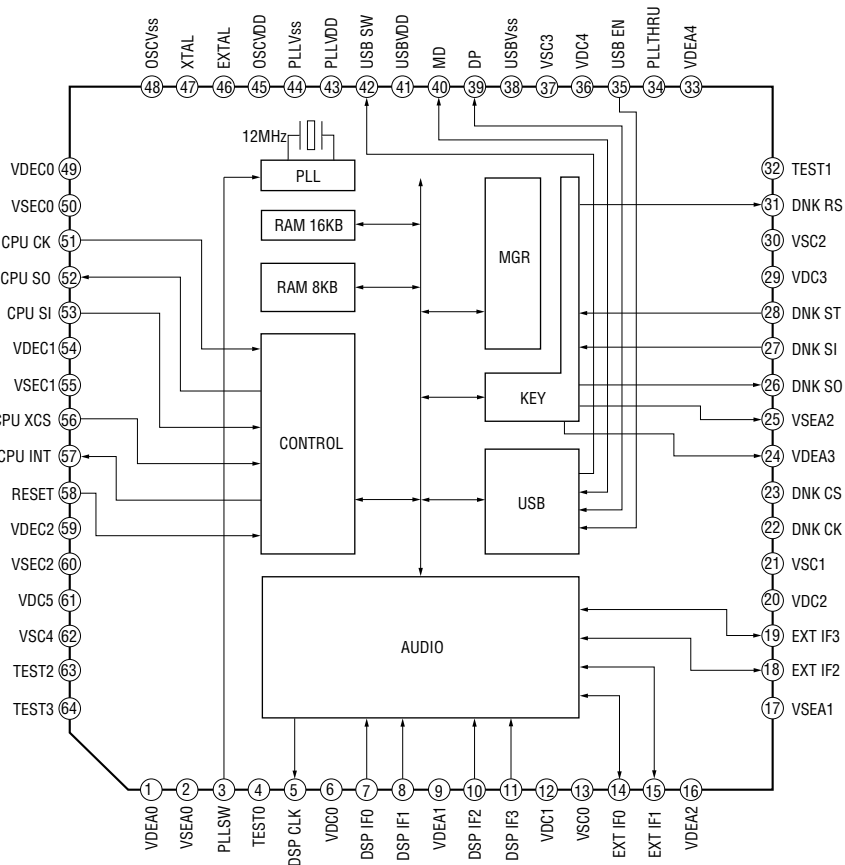
IC500 AK4524 (MAIN BOARD)



IC461 LB1641 (MAIN BOARD)



IC201 CXD1873R (USB BOARD)



SECTION 7

EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

7-1. CHASSIS SECTION-1

- Color indication of Appearance Parts
Example :
KNOB, BALANCE (WHITE)... (RED)

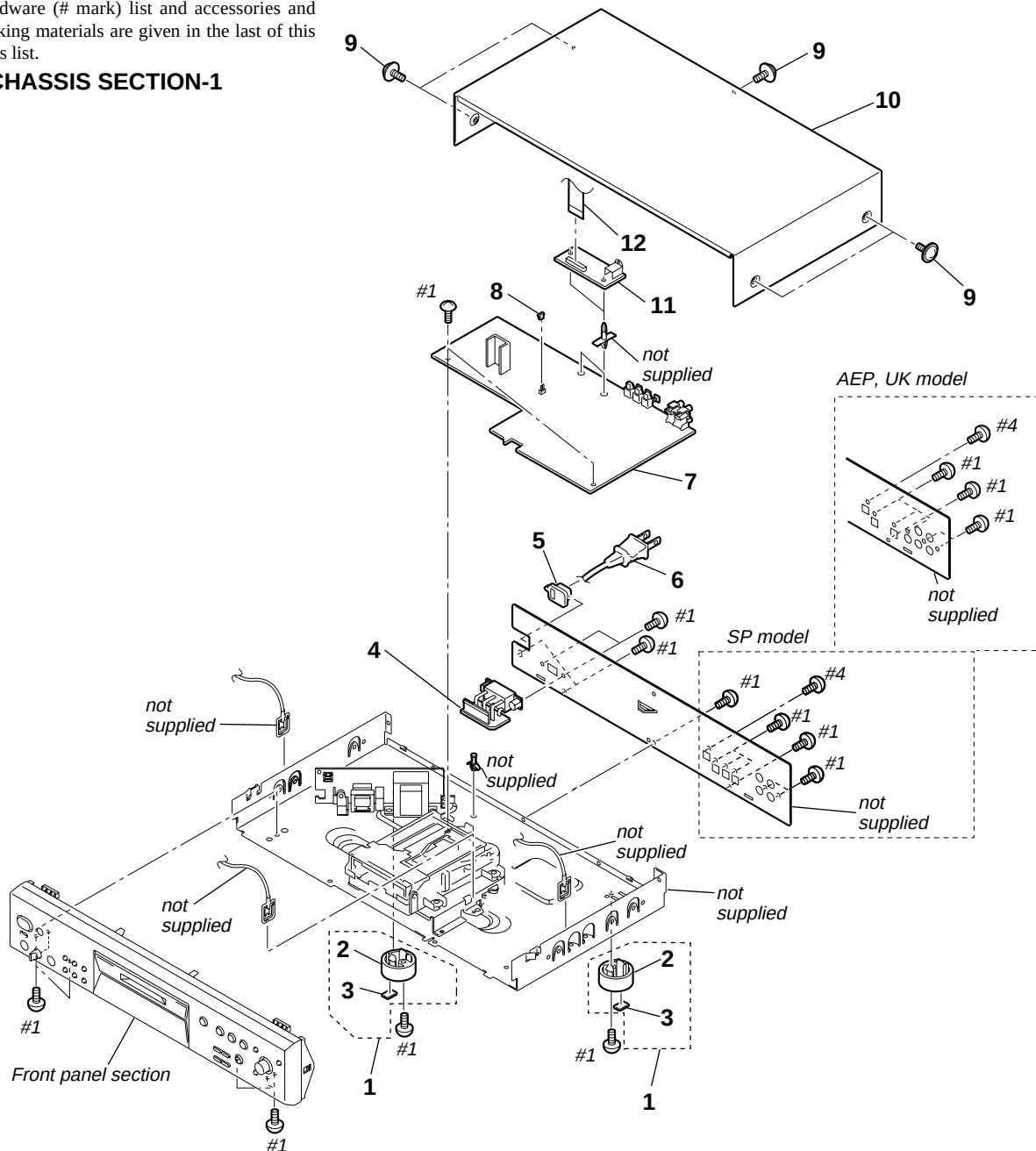
↑

↑

Parts color

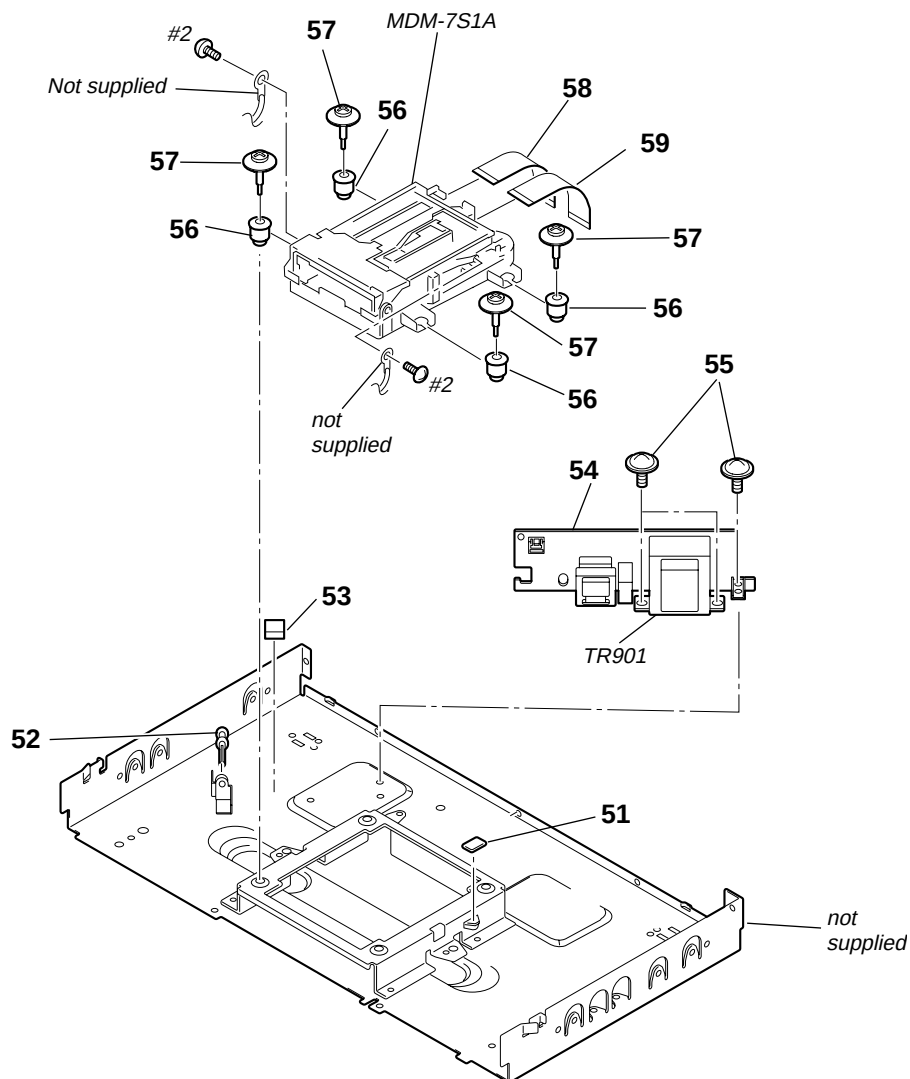
Cabinet's color
- Abbreviation
SP : Singapore model

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
1	X-4953-448-1	FOOT ASSY		9	4-210-291-01	SCREW (CASE 3 TP2)...(BLACK)	
2	4-232-237-01	FOOT (DIA. 30)					
3	4-977-358-01	CUSHION		9	4-210-291-11	SCREW (CASE 3 TP2)...(SILVER)	
4	1-684-130-12	VOL SEL BOARD (SP)		10	4-232-149-31	CASE ...(BLACK)	
* 5	3-703-244-00	BUSHING (2104), CORD		10	4-232-580-31	CASE ...(SILVER)	
				11	A-4728-568-A	USB BOARD, COMPLETE	
△ 6	1-775-787-41	CORD, POWER		12	1-824-046-11	WIRE (FLAT TYPE) (19 CORE)	
7	A-4728-563-A	MAIN BOARD, COMPLETE	(AEP,UK)				
7	A-4728-570-A	MAIN BOARD, COMPLETE	(SP)	#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
* 8	1-569-972-21	SOCKET, SHORT 2P		#4	7-685-871-09	SCREW +BVTT 3X6 (S)	

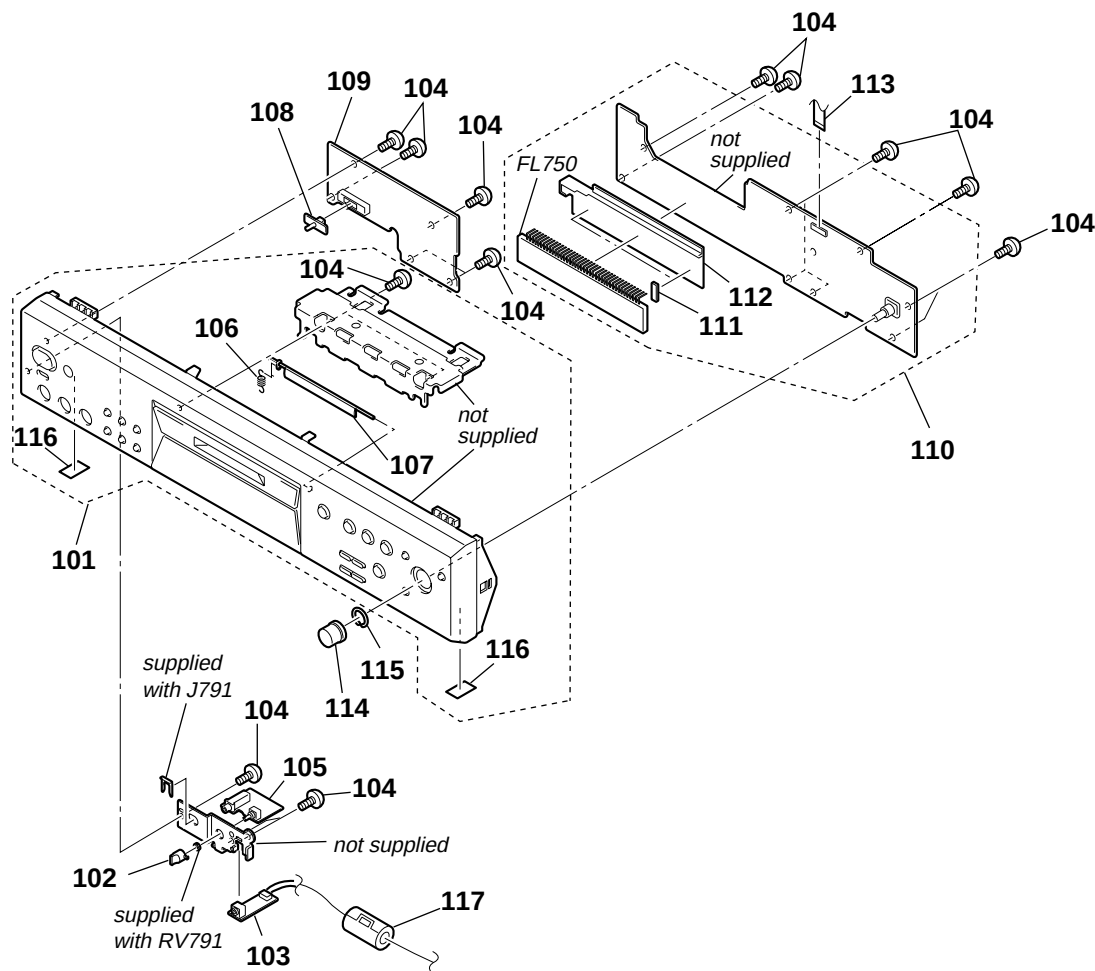
7-2. CHASSIS SECTION-2



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
51	4-977-358-01	CUSHION		57	4-228-643-11	SCREW (+BVTTWH M3), STEP	
52	3-531-576-41	RIVET (DIA. 3), NYLON		58	1-824-047-11	WIRE (FLAT TYPE) (23 CORE)	
53	3-937-248-01	CUSHION (A)		59	1-824-048-11	WIRE (FLAT TYPE) (27 CORE)	
54	1-684-129-12	PT BOARD		△ TR901	1-437-339-11	TRANSFORMER, POWER	(AEP,UK)
55	3-703-249-01	SCREW, S TIGHT, +PTTWH 3X6					
				△ TR901	1-437-340-11	TRANSFORMER, POWER	(SP)
56	4-228-689-01	INSULATOR		#2	7-685-850-04	SCREW +BVTT 2X3 (S)	

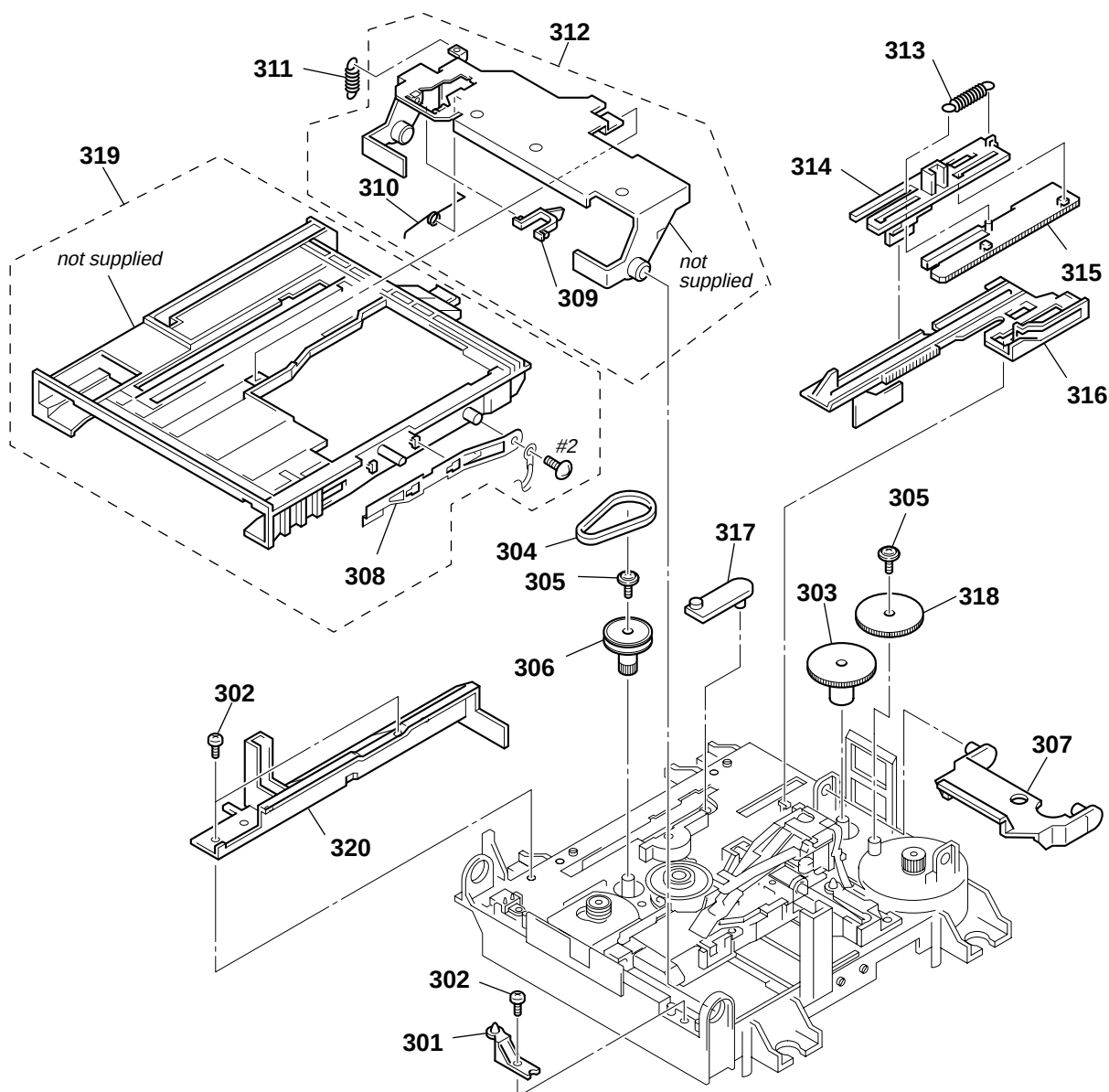
The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

7-3. FRONT PANEL SECTION



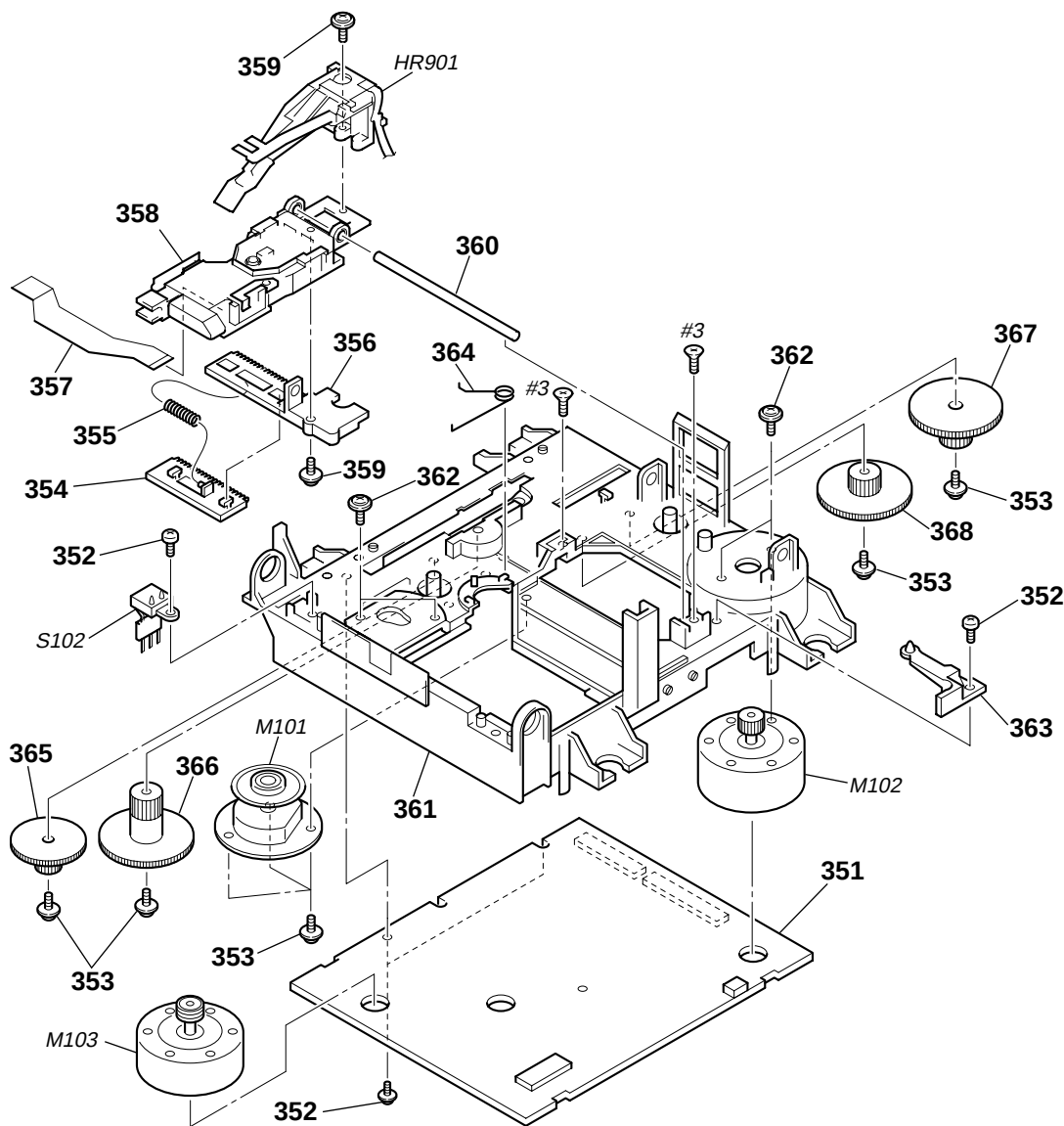
Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
101	X-4954-535-2	PANEL ASSY, FRONT...(BLACK)		109	1-684-126-12	KEY SW BOARD	
101	X-4954-536-1	PANEL ASSY, FRONT...(SILVER)		110	A-4728-564-A	DISPLAY BOARD, COMPLETE (AEP,UK)	
102	3-931-378-31	KNOB (F10)...(SILVER)					
102	3-931-378-51	KNOB (F10)...(BLACK)		110	A-4728-571-A	DISPLAY BOARD, COMPLETE (SP)	
103	1-684-128-12	KB BOARD		* 111	4-955-901-01	CUSHION (FL)	
				* 112	4-996-686-03	HOLDER (FL)	
104	4-951-620-01	SCREW (2.6X8), +BVTP		113	1-824-045-11	WIRE (FLAT TYPE) (17 CORE)	
105	1-684-127-12	HP BOARD (SP)		114	4-231-928-01	KNOB (AMS)...(BLACK)	
105	A-4728-566-A	HP BOARD, COMPLETE (AEP,UK)					
106	4-228-630-01	SPRING (LID), TENSION COIL		114	4-231-928-11	KNOB (AMS)...(SILVER)	
107	4-228-629-81	LID (MD)...(BLACK)		115	3-354-981-11	SPRING (SUS), RING	
				116	4-977-358-01	CUSHION	
107	4-230-848-21	LID (MD)...(SILVER)		117	1-500-082-11	CLAMP, SLEEVE FERRITE	
108	4-971-774-01	KNOB (TIMER)...(BLACK)		FL750	1-517-987-11	INDICATOR TUBE, FLUORESCENT	
108	4-971-774-31	KNOB (TIMER)...(SILVER)					

7-4. MECHANISM SECTION-1 (MDM-7S1A)



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
* 301	4-996-267-01	BASE (BU-D)		312	A-4680-638-B	RETAINER COMPLETE ASSY	
302	4-231-319-01	SCREW (2X6) CZN, +B (P) TRI		313	4-227-013-01	SPRING (EJ), TENSION	
303	4-227-007-01	GEAR (SB)		314	4-226-995-01	SLIDER (EJ)	
304	4-227-025-01	BELT (LOADING)		315	4-226-996-01	LIMITER (EJ)	
305	3-372-761-01	SCREW (M1.7), TAPPING		316	4-226-997-04	SLIDER	
306	4-227-002-01	GEAR, PULLEY		317	4-226-998-01	LEVER (CHG)	
307	4-226-999-01	LEVER (HEAD)		318	4-227-006-01	GEAR (SA)	
308	X-4952-665-1	SPRING (SHT) ASSY, LEAF		319	A-4735-075-B	HOLDER ASSY	
309	A-4680-638-A	LOCK (HOLDER)		320	4-226-994-01	GUIDE (L)	
310	4-229-533-02	SPRING (STOPPER), TORSION		#2	7-685-850-04	SCREW +BVTT 2X3 (S)	
311	4-231-118-01	SPRING (HOLDER), TENSION					

7-5. MECHANISM SECTION-2
(MDM-7S1A)



The components identified by mark $\triangle$ or dotted line with mark $\triangle$ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
351	A-4727-976-A	BD BOARD, COMPLETE		363	4-226-990-04	BASE (BU-A)	
352	4-231-319-01	SCREW (2X6) CZN, +B (P) TRI		364	4-230-716-01	SPRING (SPDL), TORSION	
353	3-372-761-01	SCREW (M1.7), TAPPING		365	4-227-004-01	GEAR (LC)	
354	4-226-993-01	RACK		366	4-227-005-01	GEAR (LD)	
355	4-227-014-01	SPRING (RACK), COMPRESSION		367	4-227-009-01	GEAR (SD)	
356	4-226-992-01	BASE, SL		368	4-227-008-01	GEAR (SC)	
357	1-678-514-11	PWB, FLEXIBLE		HR901	1-500-670-22	HEAD, OVER LIGHT	
$\triangle$ 358	A-4672-541-A	OPTICAL PICK-UP KMS-260E		M101	A-4735-757-A	MOTOR ASSY, SPINDLE	
359	4-988-560-01	SCREW (+P 1.7X6)		M102	A-4735-076-A	MOTOR ASSY, SLED	
360	4-996-265-01	SHAFT, MAIN		M103	A-4735-074-A	MOTOR ASSY, LOADING	
361	4-226-989-01	CHASSIS		S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT)	
362	4-232-270-01	SCREW (1.7X3.5), +PWH		#3	7-685-204-19	SCREW +KTP 2X6 TYPE2 NON-SLIT	

SECTION 8 ELECTRICAL PARTS LIST

BD

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked “*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
uF: μ F
- RESISTORS
All resistors are in ohms.
METAL: metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- COILS
uH: μ H
- SEMICONDUCTORS
In each case, u: μ , for example:
uA...: μ A..., uPA..., μ PA...,
uPB..., μ PB..., uPC..., μ PC...,
uPD..., μ PD...
- Abbreviation
SP : Singapore model

When indicating parts by reference number, please include the board name.

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks		Ref. No.	Part No.	Description	Remarks	
	A-4727-976-A	BD MOUNTED BOARD, COMPLETE *****			C241	1-164-156-11	CERAMIC CHIP 0.1uF		25V
		< CAPACITOR >			C242	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C101	1-117-720-11	CERAMIC CHIP 4.7uF		10V	C250	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C103	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V	C251	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C104	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C252	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C105	1-135-259-11	TANTAL. CHIP 10uF	20%	6.3V					
C106	1-135-259-11	TANTAL. CHIP 10uF	20%	6.3V	C253	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C107	1-164-227-11	CERAMIC CHIP 0.022uF	10%	25V	C254	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V
C108	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C255	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C109	1-165-176-11	CERAMIC CHIP 0.047uF	10%	16V	C299	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C110	1-115-416-11	CERAMIC CHIP 0.001uF	5%	25V	C301	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C111	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V					
C112	1-164-227-11	CERAMIC CHIP 0.022uF	10%	25V	C302	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C113	1-162-969-11	CERAMIC CHIP 0.0068uF	10%	25V	C405	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C114	1-162-966-11	CERAMIC CHIP 0.0022uF	10%	50V	C406	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V
C115	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C407	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C116	1-117-720-11	CERAMIC CHIP 4.7uF		10V	C409	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C117	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V					
C118	1-162-968-11	CERAMIC CHIP 0.0047uF	10%	50V	C410	1-126-206-11	ELECT CHIP 100uF	20%	6.3V
C119	1-125-837-91	CERAMIC CHIP 1uF	10%	6.3V	C411	1-117-720-11	CERAMIC CHIP 4.7uF		10V
C120	1-110-563-11	CERAMIC CHIP 0.068uF	10%	16V	C412	1-162-964-11	CERAMIC CHIP 0.001uF	10%	50V
C121	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V	C490	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C122	1-164-677-11	CERAMIC CHIP 0.033uF	10%	16V	C501	1-131-872-91	CERAMIC CHIP 1000PF	10%	630V
C175	1-164-156-11	CERAMIC CHIP 0.1uF		25V					
C194	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C502	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C205	1-162-968-11	CERAMIC CHIP 0.0047uF	10%	50V	C503	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C206	1-126-206-11	ELECT CHIP 100uF	20%	6.3V	C504	1-117-370-11	CERAMIC CHIP 10uF		10V
					C505	1-126-206-11	ELECT CHIP 100uF	20%	6.3V
C209	1-162-927-11	CERAMIC CHIP 100PF	5%	50V	C550	1-117-970-11	ELECT CHIP 22uF	20%	10V
C211	1-162-927-11	CERAMIC CHIP 100PF	5%	50V					
C212	1-162-927-11	CERAMIC CHIP 100PF	5%	50V	C701	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C214	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V	C702	1-117-720-11	CERAMIC CHIP 4.7uF		10V
C215	1-164-677-11	CERAMIC CHIP 0.033uF	10%	16V	C703	1-164-156-11	CERAMIC CHIP 0.1uF		25V
					C704	1-165-176-11	CERAMIC CHIP 0.047uF	10%	16V
C216	1-125-889-91	CERAMIC CHIP 2.2uF	10%	10V	C803	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C219	1-162-927-11	CERAMIC CHIP 100PF	5%	50V					
C220	1-125-891-11	CERAMIC CHIP 0.47uF	10%	10V	C809	1-117-720-11	CERAMIC CHIP 4.7uF		10V
C221	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V	C812	1-216-864-11	METAL CHIP 0	5%	1/16W
C230	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C899	1-164-156-11	CERAMIC CHIP 0.1uF		25V
					C901	1-126-206-11	ELECT CHIP 100uF	20%	6.3V
C231	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C902	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C233	1-164-156-11	CERAMIC CHIP 0.1uF		25V					
C234	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C903	1-126-206-11	ELECT CHIP 100uF	20%	6.3V
C235	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C904	1-164-156-11	CERAMIC CHIP 0.1uF		25V
C240	1-164-156-11	CERAMIC CHIP 0.1uF		25V	C905	1-126-206-11	ELECT CHIP 100uF	20%	6.3V
					C907	1-162-970-11	CERAMIC CHIP 0.01uF	10%	25V
					C908	1-117-370-11	CERAMIC CHIP 10uF		10V
					C909	1-104-852-11	TANTAL. CHIP 22uF	20%	10V
					C998	1-164-156-11	CERAMIC CHIP 0.1uF		25V
					C999	1-164-156-11	CERAMIC CHIP 0.1uF		25V
					C1102	1-164-156-11	CERAMIC CHIP 0.1uF		25V

MDS-JE780

BD

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
< CONNECTOR >				R107	1-216-819-11	METAL CHIP	680 5% 1/16W
CN101	1-766-833-21	CONNECTOR, FFC/FPC (ZIF) 21P		R108	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
CN102	1-784-835-21	CONNECTOR, FFC(LIF(NON-ZIF))27P		R109	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
CN103	1-784-834-21	CONNECTOR, FFC(LIF(NON-ZIF))23P		R110	1-216-853-11	METAL CHIP	470K 5% 1/16W
* CN104	1-580-055-21	PIN, CONNECTOR (SMD) 2P		R111	1-216-833-11	METAL CHIP	10K 5% 1/16W
CN105	1-784-859-21	CONNECTOR, FFC(LIF(NON-ZIF))7P		R112	1-216-845-11	METAL CHIP	100K 5% 1/16W
< DIODE >				R113	1-216-833-11	METAL CHIP	10K 5% 1/16W
D101	8-719-988-61	DIODE 1SS355TE-17		R114	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
D501	8-719-080-81	DIODE FS1J6		R115	1-216-833-11	METAL CHIP	10K 5% 1/16W
D502	8-719-080-81	DIODE FS1J6		R116	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
< IC >				R117	1-216-845-11	METAL CHIP	100K 5% 1/16W
IC101	8-752-080-95	IC CXA2523AR		R118	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
IC153	8-759-671-27	IC MSM51V4400E-70TS-K		R119	1-216-837-11	METAL CHIP	22K 5% 1/16W
IC181	8-759-481-17	IC MC74ACT08DTR2		R120	1-216-839-11	METAL CHIP	33K 5% 1/16W
IC195	(not supplied)	IC BR24C16F-E2		R121	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
IC201	8-752-414-89	IC CXD2664R		R122	1-216-833-11	METAL CHIP	10K 5% 1/16W
IC401	8-759-836-79	IC BH6519FS-E2		R201	1-216-815-11	METAL CHIP	330 5% 1/16W
IC701	8-759-473-51	IC TLV2361CDBV		R202	1-216-819-11	METAL CHIP	680 5% 1/16W
IC803	6-701-793-01	IC CY24115-2SCT		R203	1-216-809-11	METAL CHIP	100 5% 1/16W
IC926	8-759-835-63	IC NJM2391DL1-26(TE1)		R205	1-216-833-11	METAL CHIP	10K 5% 1/16W
IC933	8-759-460-72	IC BA033FP-E2		R206	1-216-833-11	METAL CHIP	10K 5% 1/16W
< COIL >				R207	1-216-811-11	METAL CHIP	150 5% 1/16W
L8	1-414-760-21	FERRITE 0uH		R208	1-216-821-11	METAL CHIP	1K 5% 1/16W
L10	1-469-981-21	FERRITE 0uH		R209	1-216-815-11	METAL CHIP	330 5% 1/16W
L122	1-414-760-21	FERRITE 0uH		R210	1-216-839-11	METAL CHIP	33K 5% 1/16W
L201	1-414-760-21	FERRITE 0uH		R211	1-216-857-11	METAL CHIP	1M 5% 1/16W
L202	1-469-981-21	FERRITE 0uH		R212	1-216-851-11	METAL CHIP	330K 5% 1/16W
L203	1-414-760-21	FERRITE 0uH		R214	1-216-845-11	METAL CHIP	100K 5% 1/16W
L401	1-400-050-11	FERRITE 0uH		R216	1-216-864-11	METAL CHIP	0 5% 1/16W
L402	1-400-050-11	FERRITE 0uH		R217	1-216-833-11	METAL CHIP	10K 5% 1/16W
L501	1-400-050-11	FERRITE 0uH		R218	1-216-864-11	METAL CHIP	0 5% 1/16W
L502	1-400-050-11	FERRITE 0uH		R219	1-216-809-11	METAL CHIP	100 5% 1/16W
L550	1-414-760-21	FERRITE 0uH		R224	1-216-809-11	METAL CHIP	100 5% 1/16W
L601	1-469-981-21	FERRITE 0uH		R225	1-216-809-11	METAL CHIP	100 5% 1/16W
L602	1-469-981-21	FERRITE 0uH		R226	1-216-809-11	METAL CHIP	100 5% 1/16W
L603	1-414-760-21	FERRITE 0uH		R228	1-216-809-11	METAL CHIP	100 5% 1/16W
L701	1-414-760-21	FERRITE 0uH		R281	1-216-821-11	METAL CHIP	1K 5% 1/16W
L801	1-414-760-21	FERRITE 0uH		R298	1-216-809-11	METAL CHIP	100 5% 1/16W
* L899	1-500-282-11	FERRITE 0uH		R299	1-216-864-11	METAL CHIP	0 5% 1/16W
< TRANSISTOR >				R301	1-216-833-11	METAL CHIP	10K 5% 1/16W
Q181	8-729-018-75	TRANSISTOR 2SJ278MY		R302	1-216-833-11	METAL CHIP	10K 5% 1/16W
Q182	8-729-017-65	TRANSISTOR 2SK1764KY		R303	1-216-833-11	METAL CHIP	10K 5% 1/16W
Q201	8-729-403-35	TRANSISTOR UN5113		R405	1-216-864-11	METAL CHIP	0 5% 1/16W
Q202	8-729-101-07	TRANSISTOR 2SB798-DL		R501	1-220-942-11	METAL CHIP	3.3 1% 1/4
Q203	8-729-403-35	TRANSISTOR UN5113		R502	1-220-942-11	METAL CHIP	3.3 1% 1/4
Q701	8-729-402-93	TRANSISTOR UN5214		R551	1-216-841-11	METAL CHIP	47K 5% 1/16W
Q702	8-729-903-10	TRANSISTOR FMW1		R552	1-216-841-11	METAL CHIP	47K 5% 1/16W
Q703	8-729-402-93	TRANSISTOR UN5214		R553	1-216-841-11	METAL CHIP	47K 5% 1/16W
Q704	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR		R701	1-216-821-11	METAL CHIP	1K 5% 1/16W
< RESISTOR >				R702	1-216-821-11	METAL CHIP	1K 5% 1/16W
R101	1-216-298-00	METAL CHIP 2.2 5% 1/10W		R703	1-216-821-11	METAL CHIP	1K 5% 1/16W
R102	1-219-724-11	METAL CHIP 1 1% 1/4W		R704	1-216-841-11	METAL CHIP	47K 5% 1/16W
R103	1-216-829-11	METAL CHIP 4.7K 5% 1/16W		R705	1-216-833-11	METAL CHIP	10K 5% 1/16W
R104	1-216-853-11	METAL CHIP 470K 5% 1/16W		R706	1-218-855-11	METAL CHIP	2.2K 0.5% 1/10W
R105	1-216-863-11	RES-CHIP 3.3M 5% 1/10W		R707	1-218-863-11	METAL CHIP	4.7K 0.5% 1/10W
R106	1-216-845-11	METAL CHIP 100K 5% 1/16W		R708	1-218-863-11	METAL CHIP	4.7K 0.5% 1/10W
				R709	1-218-855-11	METAL CHIP	2.2K 0.5% 1/10W
				R710	1-218-887-11	METAL CHIP	47K 0.5% 1/10W
				R711	1-216-833-11	METAL CHIP	10K 5% 1/16W
				R712	1-216-809-11	METAL CHIP	100 5% 1/16W
				R713	1-216-833-11	METAL CHIP	10K 5% 1/16W

						BD					DISPLAY		HP	KB
Ref. No.	Part No.	Description				Remarks	Ref. No.	Part No.	Description				Remarks	
R802	1-216-864-11	METAL CHIP	0	5%	1/16W	R712	1-249-417-11	CARBON	1K	5%	1/4W	F		
R803	1-216-864-11	METAL CHIP	0	5%	1/16W	R713	1-249-421-11	CARBON	2.2K	5%	1/4W	F		
R805	1-216-809-11	METAL CHIP	100	5%	1/16W	R714	1-249-421-11	CARBON	2.2K	5%	1/4W	F		
						R715	1-249-425-11	CARBON	4.7K	5%	1/4W	F		
R814	1-216-864-11	METAL CHIP	0	5%	1/16W	R716	1-249-429-11	CARBON	10K	5%	1/4W			
R815	1-216-864-11	METAL CHIP	0	5%	1/16W									
< SWITCH >						R761	1-247-807-31	CARBON	100	5%	1/4W			
						R762	1-247-807-31	CARBON	100	5%	1/4W			
						R763	1-249-441-11	CARBON	100K	5%	1/4W			
S101	1-762-596-21	SWITCH, PUSH (1 KEY) (LIMIT IN)				R764	1-249-441-11	CARBON	100K	5%	1/4W			
S103	1-771-956-21	SWITCH, PUSH (1 KEY) (OUT)				R766	1-247-843-11	CARBON	3.3K	5%	1/4W			
S104	1-771-955-21	SWITCH, PUSH (1 KEY) (PLAY)												
S105	1-771-955-21	SWITCH, PUSH (1 KEY) (REC)				R767	1-247-807-31	CARBON	100	5%	1/4W			
*****						R768	1-247-807-31	CARBON	100	5%	1/4W			
	A-4728-564-A	DISPLAY BOARD, COMPLETE (AEP,UK)				R769	1-247-807-31	CARBON	100	5%	1/4W			
	A-4728-571-A	DISPLAY BOARD, COMPLETE (SP)				R770	1-247-807-31	CARBON	100	5%	1/4W			
		*****				R772	1-249-417-11	CARBON	1K	5%	1/4W	F		
						< SWITCH >								
*	4-955-901-01	CUSHION (FL)				S701	1-762-875-21	SWITCH, KEYBOARD (REC ●)						
*	4-996-686-03	HOLDER (FL)				S702	1-762-875-21	SWITCH, KEYBOARD (■)						
						S703	1-762-875-21	SWITCH, KEYBOARD (▶▶)						
						S704	1-762-875-21	SWITCH, KEYBOARD (◀◀)						
						S705	1-762-875-21	SWITCH, KEYBOARD (■)						
C750	1-164-159-11	CERAMIC	0.1uF		50V									
C753	1-124-261-00	ELECT	10uF	20%	50V	S706	1-762-875-21	SWITCH, KEYBOARD (▷)						
C754	1-124-261-00	ELECT	10uF	20%	50V	S711	1-762-875-21	SWITCH, KEYBOARD (MENU/NO)						
C760	1-126-153-11	ELECT	22uF	20%	6.3V	S712	1-762-875-21	SWITCH, KEYBOARD (YES)						
C761	1-162-294-31	CERAMIC	0.001uF	10%	50V	S713	1-475-235-21	ENCODER, ROTARY						
								(◀◀◀AMS▶▶▶) /PUSH ENTER)						
C762	1-162-294-31	CERAMIC	0.001uF	10%	50V	S714	1-762-875-21	SWITCH, KEYBOARD (CLEAR)						
C766	1-162-215-31	CERAMIC	47PF	5%	50V									
C767	1-164-159-11	CERAMIC	0.1uF		50V	S715	1-762-875-21	SWITCH, KEYBOARD (INPUT)						
C768	1-162-294-31	CERAMIC	0.001uF	10%	50V	S716	1-762-875-21	SWITCH, KEYBOARD (REC MODE)						
C769	1-162-294-31	CERAMIC	0.001uF	10%	50V	S721	1-762-875-21	SWITCH, KEYBOARD (EJECT△)						

C770	1-162-294-31	CERAMIC	0.001uF	10%	50V		A-4728-566-A	HP BOARD, COMPLETE (AEP,UK)						
C771	1-164-159-11	CERAMIC	0.1uF		50V		1-684-127-12	HP BOARD (SP)						
C776	1-164-159-11	CERAMIC	0.1uF		50V			*****						
						< CAPACITOR >								
CN701	1-779-554-21	CONNECTOR,FFC(LIF(NON-ZIF))17P				C790	1-164-159-11	CERAMIC	0.1uF		50V			
CN711	1-568-669-11	CONNECTOR, BOARD TO BOARD 8P				C791	1-162-290-31	CERAMIC	470PF	10%	50V			
						C792	1-162-290-31	CERAMIC	470PF	10%	50V			
						C793	1-164-159-11	CERAMIC	0.1uF		50V			
						< JACK >								
D772	8-719-075-60	DIODE SELS5823C-TP15 (MD LP)				J791	1-770-307-11	JACK (LARGE TYPE) (PHONES)						
						< RESISTOR >								
FL750	1-517-987-11	INDICATOR TUBE, FLUORESCENT				R791	1-249-393-11	CARBON	10	5%	1/4W	F		
						R792	1-249-393-11	CARBON	10	5%	1/4W	F		
						< VARIABLE RESISTOR >								
						RV791	1-225-590-11	RES, VAR, CARBON 20K/20K (PHONE LEVEL)						

							1-684-128-12	KB BOARD						

						< JACK >								
						J780	1-785-945-21	CONNECTOR, DIN (KEY BOARD)						
						< RESISTOR >								
R702	1-249-417-11	CARBON	1K	5%	1/4W	F	R1781	1-249-409-11	CARBON	220	5%	1/4W	F	
R703	1-249-421-11	CARBON	2.2K	5%	1/4W	F	R1785	1-249-409-11	CARBON	220	5%	1/4W	F	
R704	1-249-421-11	CARBON	2.2K	5%	1/4W	F	*****							
R705	1-249-425-11	CARBON	4.7K	5%	1/4W	F								
R706	1-249-429-11	CARBON	10K	5%	1/4W									

KEY SW

MAIN

Ref. No.	Part No.	Description				Remarks	Ref. No.	Part No.	Description				Remarks
	1-684-126-12	KEY SW BOARD *****					C62	1-164-159-11	CERAMIC	0.1uF			50V
		< CAPACITOR >					C85	1-162-294-31	CERAMIC	0.001uF	10%		50V
							C86	1-162-294-31	CERAMIC	0.001uF	10%		50V
							C87	1-162-306-11	CERAMIC	0.01uF	30%		16V
C730	1-164-159-11	CERAMIC	0.1uF		50V		C88	1-162-306-11	CERAMIC	0.01uF	30%		16V
C740	1-164-159-11	CERAMIC	0.1uF		50V		C89	1-162-294-31	CERAMIC	0.001uF	10%		50V
C741	1-124-584-00	ELECT	100uF	20%	10V								
C742	1-162-306-11	CERAMIC	0.01uF	20%	16V		C93	1-164-159-11	CERAMIC	0.1uF			50V
C747	1-164-159-11	CERAMIC	0.1uF		50V		C100	1-126-964-11	ELECT	10uF	20%		50V
		< CONNECTOR >					C101	1-136-356-11	MYLAR	470PF	5%		50V
							C102	1-128-551-11	ELECT	22uF	20%		25V
							C103	1-126-933-11	ELECT	100uF	20%		16V
CN721	1-766-739-11	CONNECTOR, BOARD TO BOARD 8P											
		< DIODE >					C104	1-128-551-11	ELECT	22uF	20%		25V
							C111	1-137-505-11	MYLAR	220PF	5%		50V
D726	8-719-071-44	DIODE SELS5223C-TP15					C115	1-137-503-11	MYLAR	0.0001uF	5%		50V
D733	8-719-075-60	DIODE SELS5823C-TP15					C116	1-137-503-11	MYLAR	0.0001uF	5%		50V
		< IC >					C117	1-136-287-11	MYLAR	0.0047uF	5%		50V
IC741	8-759-826-34	IC NJL74H400A											
		< TRANSISTOR >					C118	1-130-471-00	MYLAR	0.001uF	5%		50V
							C119	1-128-551-11	ELECT	22uF	20%		25V
							C120	1-136-356-11	MYLAR	470PF	5%		50V
							C126	1-126-933-11	ELECT	100uF	20%		16V
							C131	1-126-933-11	ELECT	100uF	20%		16V
Q726	8-729-900-80	TRANSISTOR DTC114ES					C201	1-136-356-11	MYLAR	470PF	5%		50V
Q733	8-729-900-80	TRANSISTOR DTC114ES					C202	1-128-551-11	ELECT	22uF	20%		25V
		< RESISTOR >					C203	1-126-933-11	ELECT	100uF	20%		16V
							C204	1-128-551-11	ELECT	22uF	20%		25V
							C211	1-137-505-11	MYLAR	220PF	5%		50V
R722	1-249-417-11	CARBON	1K	5%	1/4W F								
R723	1-249-421-11	CARBON	2.2K	5%	1/4W F		C215	1-137-503-11	MYLAR	0.0001uF	5%		50V
R724	1-249-421-11	CARBON	2.2K	5%	1/4W F		C216	1-137-503-11	MYLAR	0.0001uF	5%		50V
R725	1-249-425-11	CARBON	4.7K	5%	1/4W F		C217	1-136-287-11	MYLAR	0.0047uF	5%		50V
R732	1-249-417-11	CARBON	1K	5%	1/4W F		C218	1-130-471-00	MYLAR	0.001uF	5%		50V
							C219	1-128-551-11	ELECT	22uF	20%		25V
R733	1-249-421-11	CARBON	2.2K	5%	1/4W F								
R741	1-249-401-11	CARBON	47	5%	1/4W F		C220	1-136-356-11	MYLAR	470PF	5%		50V
R742	1-247-807-31	CARBON	100	5%	1/4W		C226	1-126-933-11	ELECT	100uF	20%		16V
R747	1-249-429-11	CARBON	10K	5%	1/4W		C231	1-126-933-11	ELECT	100uF	20%		16V
R1726	1-249-417-11	CARBON	1K	5%	1/4W F		C401	1-126-939-11	ELECT	10000uF	20%		16V
							C402	1-164-159-11	CERAMIC	0.1uF			50V
R1733	1-249-417-11	CARBON	1K	5%	1/4W F								
		< SWITCH >					C403	1-126-933-11	ELECT	100uF	20%		16V
							C406	1-162-306-11	CERAMIC	0.01uF	30%		16V
							C407	1-124-252-00	ELECT	0.33uF	20%		50V
S722	1-762-875-21	SWITCH, KEYBOARD (PLAY MODE)					C411	1-126-768-11	ELECT	2200uF	20%		16V
S723	1-762-875-21	SWITCH, KEYBOARD (REPEAT)					C421	1-126-939-11	ELECT	10000uF	20%		16V
S724	1-762-875-21	SWITCH, KEYBOARD (LEVEL/DISPLAY/CHAR)											
S726	1-762-875-21	SWITCH, KEYBOARD (I/⏏)					C422	1-164-159-11	CERAMIC	0.1uF			50V
S732	1-762-875-21	SWITCH, KEYBOARD (SKIP)					C424	1-126-916-11	ELECT	1000uF	20%		6.3V
							C431	1-126-963-11	ELECT	4.7uF	20%		50V
S733	1-762-875-21	SWITCH, KEYBOARD (GROUP ON/OFF)					C432	1-126-963-11	ELECT	4.7uF	20%		50V
S734	1-762-875-21	SWITCH, KEYBOARD (NET MD)					C440	1-164-159-11	CERAMIC	0.1uF			50V
S746	1-786-174-11	SWITCH, SLIDE (TIMER)											
*****							C441	1-126-935-11	ELECT	470uF	20%		16V
							C443	1-126-935-11	ELECT	470uF	20%		16V
A-4728-563-A	MAIN BOARD, COMPLETE (AEP,UK)						C451	1-128-576-11	ELECT	100uF	20%		63V
A-4728-570-A	MAIN BOARD, COMPLETE (SP)						C452	1-164-159-11	CERAMIC	0.1uF			50V
	*****						C453	1-126-967-11	ELECT	47uF	20%		50V
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 TT(B)					C461	1-126-933-11	ELECT	100uF	20%		16V
		< LITHIUM BATTERY >					C462	1-162-306-11	CERAMIC	0.01uF	30%		16V
							C471	1-126-916-11	ELECT	1000uF	20%		6.3V
							C472	1-164-159-11	CERAMIC	0.1uF			50V
BT404	1-756-121-11	BATTERY, LITHIUM SECONDARY					C473	1-164-159-11	CERAMIC	0.1uF			50V
		< CAPACITOR >											
							C481	1-126-965-91	ELECT	22uF	20%		50V
							C500	1-126-934-11	ELECT	220uF	20%		10V
C12	1-162-294-31	CERAMIC	0.001uF	10%	50V		C501	1-164-159-11	CERAMIC	0.1uF			50V
C16	1-164-159-11	CERAMIC	0.1uF		50V		C502	1-130-475-00	MYLAR	0.0022uF	5%		50V
C19	1-162-294-31	CERAMIC	0.001uF	10%	50V		C503	1-130-475-00	MYLAR	0.0022uF	5%		50V
C58	1-162-282-31	CERAMIC	100PF	10%	50V								

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
C504	1-126-933-11	ELECT	100uF 20% 16V	D444	8-719-024-99	DIODE 11ES2-NTA2B	
C505	1-164-159-11	CERAMIC	0.1uF 50V	D451	8-719-024-99	DIODE 11ES2-NTA2B	
C508	1-128-801-11	CERAMIC	22PF 5% 50V	D452	8-719-109-81	DIODE RD4.7ESB2	
C509	1-128-801-11	CERAMIC	22PF 5% 50V	< GROUND TERMINAL >			
C515	1-162-282-31	CERAMIC	100PF 10% 50V	EP440	1-537-771-21	TERMINAL BOARD, GROUND	
C516	1-162-282-31	CERAMIC	100PF 10% 50V	< IC >			
C517	1-162-282-31	CERAMIC	100PF 10% 50V	IC1	6-801-395-01	IC M30833FJFP-JE7-1	
C519	1-162-294-31	CERAMIC	0.001uF 10% 50V	IC101	8-759-634-51	IC NJM4558D	
C520	1-126-933-11	ELECT	100uF 20% 16V	IC111	8-759-634-51	IC NJM4558D	
C522	1-164-159-11	CERAMIC	0.1uF 50V	IC112	8-759-634-51	IC NJM4558D	
C523	1-126-933-11	ELECT	100uF 20% 16V	IC131	8-759-167-88	IC NJM4565D	
C524	1-164-159-11	CERAMIC	0.1uF 50V	IC401	8-759-445-59	IC BA033T	
C541	1-164-159-11	CERAMIC	0.1uF 50V	IC406	8-759-481-02	IC M62016L	
C601	1-164-159-11	CERAMIC	0.1uF 50V (AEP,UK)	IC421	8-759-231-53	IC M5F7805L	
C611	1-164-159-11	CERAMIC	0.1uF 50V	IC451	8-759-633-42	IC M5293L	
C612	1-126-963-11	ELECT	4.7uF 20% 50V	IC461	8-759-822-09	IC LB1641	
C613	1-162-306-11	CERAMIC	0.01uF 30% 16V	IC500	8-759-579-68	IC AK4524	
C621	1-164-159-11	CERAMIC	0.1uF 50V(SP)	IC611	6-600-014-01	IC TORX141L (OPTICAL IN1)	
C622	1-162-306-11	CERAMIC	0.01uF 30% 16V(SP)	IC621	6-600-014-01	IC TORX141L (OPTICAL IN2)(SP)	
C631	1-164-159-11	CERAMIC	0.1uF 50V	IC631	6-600-012-01	IC TOTX141L (OPTICAL OUT)	
C632	1-126-963-11	ELECT	4.7uF 20% 50V	IC641	8-759-917-18	IC SN74HCU04AN	
C641	1-164-159-11	CERAMIC	0.1uF 50V	IC651	8-759-916-12	IC SN74HC00AN	
C651	1-164-159-11	CERAMIC	0.1uF 50V	IC681	8-759-917-18	IC SN74HCU04AN	
C652	1-162-306-11	CERAMIC	0.01uF 30% 16V	< JACK >			
C681	1-164-159-11	CERAMIC	0.1uF 50V	J101	1-784-430-11	JACK, PIN 4P (ANALOG IN/OUT)	
< CONNECTOR >				J601	1-784-432-11	JACK, PIN 1P (COAXIAL IN) (AEP,UK)	
CN1	1-784-417-11	CONNECTOR, FFC(LIF(NON-ZIF))23P		< COIL >			
CN2	1-779-295-11	CONNECTOR, FFC(LIF(NON-ZIF))27P		L611	1-410-509-11	INDUCTOR 10uH	
CN3	1-815-620-11	CONNECTOR, FFC(LIF(NON-ZIF))17P		L631	1-410-509-11	INDUCTOR 10uH	
CN4	1-794-483-11	CONNECTOR, FFC(LIF(NON-ZIF))19P		< TRANSISTOR >			
* CN101	1-564-705-11	PIN, CONNECTOR (SMALL TYPE) 3P		Q121	8-729-029-94	TRANSISTOR DTC143TSA	
CN401	1-784-928-11	PIN, CONNECTOR 13P		Q151	8-729-422-57	TRANSISTOR UN4111	
CN404	1-568-683-11	PIN, CONNECTOR (PC BAORD) 2P		Q221	8-729-029-94	TRANSISTOR DTC143TSA	
* CN801	1-564-706-11	PIN, CONNECTOR (SMALL TYPE) 4P		Q411	8-729-142-46	TRANSISTOR 2SC2001-LK	
< DIODE >				Q461	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D101	8-719-911-19	DIODE 1SS119-25		Q462	8-729-900-80	TRANSISTOR DTC114ES	
D102	8-719-911-19	DIODE 1SS119-25		Q471	8-729-194-57	TRANSISTOR 2SC945-P	
D151	8-719-911-19	DIODE 1SS119-25		Q801	8-729-900-80	TRANSISTOR DTC114ES	
D152	8-719-911-19	DIODE 1SS119-25		Q802	8-729-620-05	TRANSISTOR 2SC2603-EF	
D201	8-719-911-19	DIODE 1SS119-25		Q803	8-729-900-80	TRANSISTOR DTC114ES	
D202	8-719-911-19	DIODE 1SS119-25		Q804	8-729-620-05	TRANSISTOR 2SC2603-EF	
D401	8-719-210-21	DIODE 11EQS04		Q805	8-729-900-80	TRANSISTOR DTC114ES	
D402	8-719-210-21	DIODE 11EQS04		Q911	8-729-922-37	TRANSISTOR 2SD2144S-UVW	
D404	8-719-911-19	DIODE 1SS119-25		< RESISTOR >			
D405	8-719-210-21	DIODE 11EQS04		R10	1-249-441-11	CARBON 100K 5% 1/4W	
D406	8-719-210-21	DIODE 11EQS04		R29	1-249-441-11	CARBON 100K 5% 1/4W	
D411	8-719-024-99	DIODE 11ES2-NTA2B		R30	1-249-441-11	CARBON 100K 5% 1/4W	
D412	8-719-024-99	DIODE 11ES2-NTA2B		R41	1-249-441-11	CARBON 100K 5% 1/4W	
D413	8-719-024-99	DIODE 11ES2-NTA2B		R44	1-249-429-11	CARBON 10K 5% 1/4W	
D414	8-719-024-99	DIODE 11ES2-NTA2B		R46	1-249-429-11	CARBON 10K 5% 1/4W	
D415	8-719-933-36	DIODE HZS6B1L		R49	1-249-429-11	CARBON 10K 5% 1/4W	
D421	8-719-024-99	DIODE 11ES2-NTA2B		R51	1-249-429-11	CARBON 10K 5% 1/4W	
D422	8-719-024-99	DIODE 11ES2-NTA2B		R53	1-249-429-11	CARBON 10K 5% 1/4W	
D431	8-719-911-19	DIODE 1SS119-25		R55	1-249-429-11	CARBON 10K 5% 1/4W	
D432	8-719-911-19	DIODE 1SS119-25					
D433	8-719-911-19	DIODE 1SS119-25					
D441	8-719-024-99	DIODE 11ES2-NTA2B					
D442	8-719-024-99	DIODE 11ES2-NTA2B					
D443	8-719-024-99	DIODE 11ES2-NTA2B					

MAIN PT

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
R61	1-249-429-11	CARBON	10K 5% 1/4W	R471	1-249-411-11	CARBON	330 5% 1/4W
R85	1-249-429-11	CARBON	10K 5% 1/4W	R472	1-249-418-11	CARBON	1.2K 5% 1/4W F
R86	1-249-429-11	CARBON	10K 5% 1/4W	R511	1-247-807-31	CARBON	100 5% 1/4W
R87	1-249-429-11	CARBON	10K 5% 1/4W	R512	1-247-807-31	CARBON	100 5% 1/4W
R88	1-249-429-11	CARBON	10K 5% 1/4W	R513	1-247-807-31	CARBON	100 5% 1/4W
R90	1-249-441-11	CARBON	100K 5% 1/4W (AEP,UK)	R514	1-247-807-31	CARBON	100 5% 1/4W
R92	1-249-429-11	CARBON	10K 5% 1/4W	R601	1-247-804-11	CARBON	75 5% 1/4W (AEP,UK)
R93	1-249-429-11	CARBON	10K 5% 1/4W	R602	1-249-417-11	CARBON	1K 5% 1/4W F (AEP,UK)
R94	1-249-429-11	CARBON	10K 5% 1/4W	R612	1-249-437-11	CARBON	47K 5% 1/4W
R95	1-249-429-11	CARBON	10K 5% 1/4W	R614	1-247-807-31	CARBON	100 5% 1/4W
R97	1-249-429-11	CARBON	10K 5% 1/4W	R622	1-249-437-11	CARBON	47K 5% 1/4W
R100	1-249-441-11	CARBON	100K 5% 1/4W	R624	1-247-807-31	CARBON	100 5% 1/4W
R101	1-249-437-11	CARBON	47K 5% 1/4W	R651	1-247-807-31	CARBON	100 5% 1/4W
R102	1-249-433-11	CARBON	22K 5% 1/4W	R681	1-249-439-11	CARBON	68K 5% 1/4W
R103	1-247-887-00	CARBON	220K 5% 1/4W	R682	1-249-417-11	CARBON	1K 5% 1/4W F
R105	1-249-401-11	CARBON	47 5% 1/4W F	R683	1-247-895-00	CARBON	470K 5% 1/4W
R111	1-215-445-00	METAL	10K 1% 1/4W	R801	1-249-429-11	CARBON	10K 5% 1/4W
R112	1-215-445-00	METAL	10K 1% 1/4W	R802	1-249-429-11	CARBON	10K 5% 1/4W
R113	1-215-445-00	METAL	10K 1% 1/4W	R803	1-249-429-11	CARBON	10K 5% 1/4W
R114	1-215-445-00	METAL	10K 1% 1/4W	R804	1-249-429-11	CARBON	10K 5% 1/4W
R115	1-215-453-00	METAL	22K 1% 1/4W	R805	1-249-425-11	CARBON	4.7K 5% 1/4W F
R116	1-215-453-00	METAL	22K 1% 1/4W	R806	1-249-425-11	CARBON	4.7K 5% 1/4W F
R117	1-215-425-00	METAL	1.5K 1% 1/4W	R807	1-249-429-11	CARBON	10K 5% 1/4W
R118	1-215-425-00	METAL	1.5K 1% 1/4W	R808	1-249-429-11	CARBON	10K 5% 1/4W
R119	1-249-413-11	CARBON	470 5% 1/4W F	R809	1-249-429-11	CARBON	10K 5% 1/4W
R120	1-249-413-11	CARBON	470 5% 1/4W F	R810	1-249-429-11	CARBON	10K 5% 1/4W
R122	1-249-441-11	CARBON	100K 5% 1/4W	R911	1-249-421-11	CARBON	2.2K 5% 1/4W F
R131	1-249-397-11	CARBON	22 5% 1/4W F	R912	1-249-437-11	CARBON	47K 5% 1/4W
R151	1-249-441-11	CARBON	100K 5% 1/4W	R1090	1-249-429-11	CARBON	10K 5% 1/4W (SP)
R152	1-247-883-00	CARBON	150K 5% 1/4W	R1091	1-249-429-11	CARBON	10K 5% 1/4W
R201	1-249-437-11	CARBON	47K 5% 1/4W	< VIBRATOR >			
R202	1-249-433-11	CARBON	22K 5% 1/4W	X15	1-795-004-21	VIBRATOR, CERAMIC (10MHz)	
R203	1-247-887-00	CARBON	220K 5% 1/4W	X509	1-781-205-21	VIBRATOR, CRYSTAL (11.2896MHz)	
R205	1-249-401-11	CARBON	47 5% 1/4W F	*****			
R211	1-215-445-00	METAL	10K 1% 1/4W	1-684-129-12	PT BOARD	*****	
R212	1-215-445-00	METAL	10K 1% 1/4W	< CAPACITOR >			
R213	1-215-445-00	METAL	10K 1% 1/4W	△ C911	1-113-920-11	CERAMIC	0.0022uF 20% 250V
R214	1-215-445-00	METAL	10K 1% 1/4W	C923	1-164-159-11	CERAMIC	0.1uF 50V
R215	1-215-453-00	METAL	22K 1% 1/4W	C924	1-164-159-11	CERAMIC	0.1uF 50V
R216	1-215-453-00	METAL	22K 1% 1/4W	C952	1-164-159-11	CERAMIC	0.1uF 50V
R217	1-215-425-00	METAL	1.5K 1% 1/4W	C953	1-164-159-11	CERAMIC	0.1uF 50V
R218	1-215-425-00	METAL	1.5K 1% 1/4W	C954	1-164-159-11	CERAMIC	0.1uF 50V
R219	1-249-413-11	CARBON	470 5% 1/4W F	C955	1-164-159-11	CERAMIC	0.1uF 50V
R220	1-249-413-11	CARBON	470 5% 1/4W F	< CONNECTOR >			
R222	1-249-441-11	CARBON	100K 5% 1/4W	* CN901	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P	
R231	1-249-397-11	CARBON	22 5% 1/4W F	< DIODE >			
R404	1-249-413-11	CARBON	470 5% 1/4W F	D911	8-719-911-19	DIODE 1SS119-25	
R406	1-249-429-11	CARBON	10K 5% 1/4W	< FILTER >			
R411	1-249-413-11	CARBON	470 5% 1/4W F	△ LF901	1-419-625-11	COIL, LINE FILTER	
R431	1-247-807-31	CARBON	100 5% 1/4W				
R432	1-249-425-11	CARBON	4.7K 5% 1/4W F				
R433	1-247-843-11	CARBON	3.3K 5% 1/4W				
R434	1-249-441-11	CARBON	100K 5% 1/4W				
R451	1-249-433-11	CARBON	22K 5% 1/4W				
R452	1-249-441-11	CARBON	100K 5% 1/4W				
R453	1-249-409-11	CARBON	220 5% 1/4W F				
R454	1-249-409-11	CARBON	220 5% 1/4W F				
R461	1-249-433-11	CARBON	22K 5% 1/4W				
R462	1-249-431-11	CARBON	15K 5% 1/4W				
R463	1-249-433-11	CARBON	22K 5% 1/4W				

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

							PT	USB	VOL SEL				
Ref. No.	Part No.	Description		Remarks			Ref. No.	Part No.	Description		Remarks		
< RELAY >							R207	1-216-864-11	METAL CHIP	0	5%	1/16W	
△ RY911	1-755-407-11	RELAY (AC POWER)					R209	1-216-833-11	METAL CHIP	10K	5%	1/16W	
< TRANSFORMER >							R210	1-216-833-11	METAL CHIP	10K	5%	1/16W	
△ TR951	1-437-693-11	TRANSFORMER, POWER (SP)					R212	1-216-864-11	METAL CHIP	0	5%	1/16W	
△ TR951	1-437-692-11	TRANSFORMER, POWER (AEP,UK)					R213	1-216-864-11	METAL CHIP	0	5%	1/16W	
*****							R214	1-216-864-11	METAL CHIP	0	5%	1/16W	
A-4728-568-A							R216	1-216-833-11	METAL CHIP	10K	5%	1/16W	
USB BOARD, COMPLETE							R217	1-216-839-11	METAL CHIP	33K	5%	1/16W	
*****							R218	1-216-837-11	METAL CHIP	22K	5%	1/16W	
< CAPACITOR >							R219	1-216-801-11	METAL CHIP	22	5%	1/16W	
C201	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R220	1-216-801-11	METAL CHIP	22	5%	1/16W	
C202	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R221	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	
C206	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R222	1-216-864-11	METAL CHIP	0	5%	1/16W	
C211	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R223	1-216-864-11	METAL CHIP	0	5%	1/16W	
C212	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R224	1-216-864-11	METAL CHIP	0	5%	1/16W	
C215	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R241	1-216-821-11	METAL CHIP	1K	5%	1/16W	
C216	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R242	1-216-841-11	METAL CHIP	47K	5%	1/16W	
C217	1-164-156-11	CERAMIC CHIP	0.1uF	25V			R243	1-216-864-11	METAL CHIP	0	5%	1/16W	
C218	1-164-156-11	CERAMIC CHIP	0.1uF	25V			< VIBRATOR >						
C219	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		X201	1-567-865-11	VIBRATOR, CRYSTAL (12MHz)				

C220	1-162-919-11	CERAMIC CHIP	22PF	5%	50V		1-684-130-12 VOL SEL BOARD (SP)						
C221	1-164-156-11	CERAMIC CHIP	0.1uF	25V			*****						
C223	1-164-156-11	CERAMIC CHIP	0.1uF	25V			< CONNECTOR >						
C226	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V		* CN991	1-573-565-11	PIN, CONNECTOR(3.96MM PITCH)5P (SP)				
C227	1-164-156-11	CERAMIC CHIP	0.1uF	25V			< SWITCH >						
C228	1-164-156-11	CERAMIC CHIP	0.1uF	25V			△ S991	1-771-474-11	SWITCH, POWER (VOLTAGE SELECTOR)(SP)				
C230	1-216-864-11	METAL CHIP	0	5%	1/16W		*****						
C235	1-164-156-11	CERAMIC CHIP	0.1uF	25V			MISCELLANEDUS						
C236	1-164-156-11	CERAMIC CHIP	0.1uF	25V			*****						
C241	1-164-156-11	CERAMIC CHIP	0.1uF	25V			△	1-569-008-21	ADAPTOR, CONVERSION (SP)				
C242	1-164-156-11	CERAMIC CHIP	0.1uF	25V			△	1-770-019-11	ADAPTOR, CONVERSION PLUG 3P (UK)				
< CONNECTOR >							△ 6	1-775-787-41	CORD, POWER				
CN201	1-778-691-11	CONNECTOR, FFC/FPC 19P					* 8	1-569-972-21	SOCKET, SHORT 2P				
CN203	1-815-194-11	CONNECTOR, USB (B) (USB)					12	1-824-046-11	WIRE (FLAT TYPE) (19 CORE)				
< DIODE >							58	1-824-047-11	WIRE (FLAT TYPE) (23 CORE)				
D201	8-719-988-61	DIODE 1SS355TE-17					59	1-824-048-11	WIRE (FLAT TYPE) (27 CORE)				
< FERRITE BEAD >							113	1-824-045-11	WIRE (FLAT TYPE) (17 CORE)				
FB201	1-216-864-11	METAL CHIP	0	5%	1/16W		117	1-500-082-11	CLAMP, SLEEVE FERRITE				
FB202	1-216-864-11	METAL CHIP	0	5%	1/16W		357	1-678-514-11	PWB, FLEXIBLE				
FB203	1-216-864-11	METAL CHIP	0	5%	1/16W		△ 358	A-4672-541-A	OPTICAL PICK-UP KMS-260E				
FB204	1-216-864-11	METAL CHIP	0	5%	1/16W		HR901	1-500-670-22	HEAD, OVER LIGHT				
< IC >							M101	A-4735-757-A	MOTOR ASSY, SPINDLE				
IC201	8-752-415-60	IC CXD1873R					M102	A-4735-076-A	MOTOR ASSY, SLED				
IC202	8-759-058-57	IC TC7S04FU-TE85L					M103	A-4735-074-A	MOTOR ASSY, LOADING				
< COIL >							S102	1-771-957-11	SWITCH, PUSH (2 KEY) (REFLECT/PROTECT)				
L202	1-216-864-11	METAL CHIP	0	5%	1/16W		△ TR901	1-437-339-11	TRANSFORMER, POWER (AEP,UK)				
L203	1-216-864-11	METAL CHIP	0	5%	1/16W		△ TR901	1-437-340-11	TRANSFORMER, POWER (SP)				
< RESISTOR >							*****						
R202	1-216-833-11	METAL CHIP	10K	5%	1/16W		The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.						
R204	1-216-809-11	METAL CHIP	100	5%	1/16W								
R205	1-216-864-11	METAL CHIP	0	5%	1/16W								
R206	1-216-864-11	METAL CHIP	0	5%	1/16W								

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MDS-JE780

Ref. No.	Part No.	Description	Remarks
		ACCESSORIES *****	
	1-476-723-11	COMMANDER, STANDARD (RM-D10E)	
	1-574-264-11	CORD, LIGHT PLUG	
	1-757-471-11	CABLE, CONNECTION (USB)	
	1-791-732-11	CORD, CONNECTION (PIN CABLE)	
	4-237-880-12	CD-ROM	
	4-237-882-11	MANUAL, INSTRUCTION (GREEK) (AEP)	
	4-237-882-21	MANUAL, INSTRUCTION (CZECH,HUNGARIAN) (AEP)	
	4-237-882-31	MANUAL, INSTRUCTION (TURKISH) (AEP)	
	4-237-882-41	MANUAL, INSTRUCTION (SLOVAK) (AEP)	
	4-239-187-11	MANUAL, INSTRUCTION (ENGLISH)	
	4-239-187-21	MANUAL, INSTRUCTION (FRENCH) (AEP,SP)	
	4-239-187-31	MANUAL, INSTRUCTION (SPANISH) (AEP,SP)	
	4-239-187-41	MANUAL, INSTRUCTION (GERMAN,DUTCH,SWEDISH)(AEP)	
	4-239-187-51	MANUAL, INSTRUCTION (ITALIAN)(AEP)	
	4-239-187-61	MANUAL, INSTRUCTION (TRADITIONAL CHINESE)(SP)	
	4-239-187-71	MANUAL, INSTRUCTION (DANISH,FINNISH) (AEP)	
	4-241-444-11	MANUAL, INSTRUCTION (GREEK)(AEP)	
	4-241-444-21	MANUAL, INSTRUCTION (CZECH,HUNGARIAN) (AEP)	
	4-241-444-31	MANUAL, INSTRUCTION (TURKISH)(AEP)	
	4-241-444-41	MANUAL, INSTRUCTION (SLOVAK)(AEP)	
	4-981-643-11	COVER, BATTERY (For RM-D10E)	